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Comparative Analysis of Reactive Routing Protocols in Manet

Jahir Hussain[1], Dr. Ramalingam Sugumar[2]
[1]Research Scholar, [2]Professor, Department of Computer Science, Christhuraj College, Trichy

Abstract: In MANET reactive protocols do not always have low control overhead, as people tend to think. The control overhead for reactive protocols is more sensitive to the traffic load, in terms of the number of traffic rows, and mobility, in terms of link connectivity change rates, than other protocols. Therefore, reactive protocols may only be suitable for MANETs with small number of traffic loads and small link connectivity change rates. It is already proved that, it is more feasible to maintain full network topology in a MANET with low control overhead. The comparative analysis of Reactive/ On-demand protocols such as Ad Hoc On-Demand Distance Vector Routing (AODV), Temporally-Ordered Routing Algorithm (TORA), and Dynamic Source Routing (DSR) are concluded in the research.

I. INTRODUCTION

Fig:1 MANET

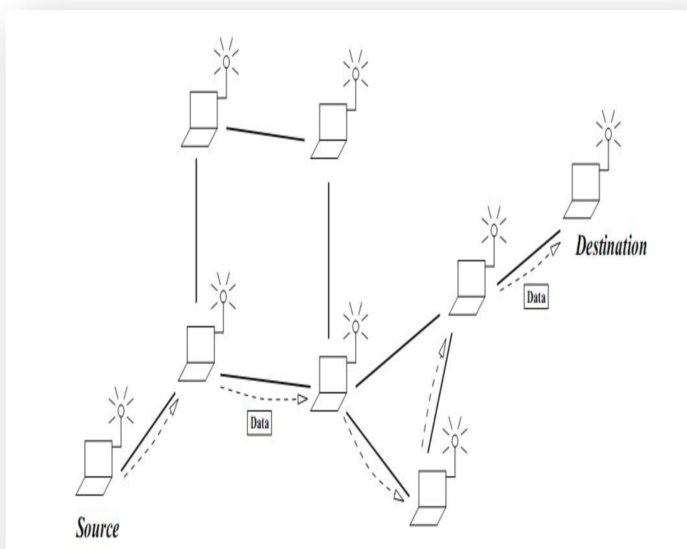

Fig 1: The Manet

The network topology in a MANET usually changes with time. Therefore, there are new challenges for routing protocols in MANETs since traditional routing protocols may not be suitable for MANETs. Researchers are designing new MANET routing protocols and comparing and improving existing MANET routing protocols before any routing protocols are standardized using simulations. However, the simulation results from different research groups are not consistent with each other. This is because of a lack of consistency in MANET routing protocol models and application environments, including networking and user traffic profiles. Many mobile ad hoc network (MANET) routing protocols have been proposed. Past work focused on designing new protocols, comparing existing protocols, or improving protocols before standard MANET routing protocols are defined. Most research in this field is based on simulation studies of the routing protocols of interest in arbitrary networks with certain traffic profiles. However, the simulation results from different research groups are not consistent. This is because of the lack of consistency in MANET routing protocol models and application environments including networking and user traffic profiles.

II. AIM AND OBJECTIVE

Analyze and Understand the performance of reactive routing protocols.

A. An attempt to improve the performance of reactive routing protocols.
B. Test the values with Constrains.
C. Comparison of Different Reactive Protocols
D. Evaluation of the better result

III. REVIEW OF LITERATURE

A mobile ad hoc network (MANET) is a network consisting of a set of mobile nodes with no centralized administration. MANET is self-configuring, self-organizing and self-maintaining. MANET may have dynamic topology. In addition, each mobile node has limited resources such as battery, processing power, and on-board memory (i.e., RAM). In MANETs, mobile nodes communicate with each other in a multi-hop fashion. That means a mobile node sends a packet to a destination through intermediate nodes. Hence, the availability of each node is equally important. Otherwise, the overall performance of the network may be affected. In order to meet these peculiar characteristics and design constraints, an efficient routing protocol is essential for MANET. Designing an efficient routing protocol for MANETs is a very challenging task and it has been an active area of research. Many routing protocols have been proposed and these protocols can be broadly classified as proactive and reactive. In proactive routing protocols like destination sequence distance vector (DSDV) (Perkins et al, 1994), mobile nodes update their routing tables by periodically exchanging routing information among them. Due to periodic information exchanges, a proactive routing protocol generates large number of control messages in the network. Hence, proactive routing protocols are not considered suitable for MANET. To overcome the imitations of proactive routing protocols, reactive routing protocols like dynamic source routing (DSR) (Broch et al., 1998) and ad hoc on-demand distance vector routing (AODV) (Perkins, 1997) protocols have been proposed for MANET. In a reactive routing protocol, a route is discovered when it is required. Reactive routing protocol consists of two main mechanisms: (a) route discovery and (b) route maintenance. A source node discovers a route to a destination by using the route discovery mechanism. On the other hand, a source node detects any topology change in the network by using the route maintenance mechanism. A global search procedure is used by the route discovery mechanism in which a source node uses flooding mechanism to discover all the available paths to a destination. Once all paths have been discovered, a source node chooses a path, which is the shortest. Studies in Anurag (2004), and Tsirigos et al. (2001) show that the shortest path algorithm may not be a good choice for MANETs. When the shortest path algorithm is used, nodes located around the center of a network carry more traffic compared to other when the shortest path algorithm is used; nodes located around the center of a network carry more traffic compared to other nodes that are located at the perimeter of the same network. Particularly, when multiple connections are set up in a network, the wireless links located at the center of the network carry more traffic and can, therefore, get congested. This type of congestion problem may affect the performance of a network in terms of delay and throughput. In mobility scenarios, the shortest path may break due to node movement. Moreover, communication through a wireless medium is inherently unreliable and is also subjected to link errors. To overcome the limitations of the shortest path routing protocols, researchers have suggested multipath routing. Multipath routing protocols proposed for MANET can be broadly classified as (a) delay aware multipath routing protocols, (b) reliable multipath routing protocols, (c) minimum overhead multipath routing protocols, (d) energy efficient multipath routing protocols and (e) hybrid multipath routing protocols. Delay aware multipath routing protocols proposed in, Huang and Fang (2005) choose multiple paths so that the overall delay performance of a network is improved. Reliable multipath routing protocols proposed in Li and Cuthbert (2004), Wang et al. (2005), Xue and Nahrstedt (2003),) support reliable data transfer between a source and a destination. Minimum overhead multipath routing protocols proposed in Ye et al. (2003), and Zeng et al. (2005) discover and use multiple paths by using a minimum number of overhead control messages. Energy efficient multipath routing protocols proposed in and Liang and Ren (2005) maximize the network life by using energy efficient path selection. Hybrid multipath routing protocols proposed in Wang et al. (2000) and Wei and Zakhor (2004) use both the shortest path and the multipath algorithms to incorporate the advantages of both algorithms.

IV. DYNAMIC SOURCE ROUTING (DSR)

Dynamic Source Routing (DSR) is a reactive protocol based on the source route approach (Johnson et al., 1996). The principal of this approach is that the whole route is chosen by the source, and it is put within each packet sent. Each node keeps in its cache the source routes learned. When it needs to send a packet, it first checks its cache, if it finds a route to the corresponding destination then it uses it, otherwise, it launches a cache, if it finds a route to the corresponding destination then it uses it, otherwise, it launches a Route discovery by broadcasting a Request (RREQ) packet through the network. When receiving the RREQ, a node seeks a route in its cache for the RREQ's destination, if it finds such a route, it sends a Route Reply (RREP) packet to the source, if no appropriate route exists then it adds its address to the request packet and continues the broadcasting. When a node detects a route failure, it sends a Route Error (RER) packet to the source that uses this link, and then this one applies again the route discovery process.

V. AD HOC ON DEMAND DISTANCE VECTOR (AODV)

Ad hoc on Demand Distance Vector (AODV) is a hop by hop routing. When a node needs to send a data packet to a destination to which it has no route, it has to broadcast a RREQ to its entire neighbor, then each neighbor do so until reaching destination. This one sends a RREQ packet that travels the inverse path until the source. Upon the reception of this reply, each intermediary updates its routing table. In this way, a route between the source and the destination is built. Unlike DSR, the source does not put the whole route within the packet, but the decision about the next hop is made separately after each hop.

VI. THE TEMPORALLY ORDERED ROUTING ALGORITHM (TORA)

The Temporally Ordered Routing Algorithm (TORA) [18,19] is a reactive routing algorithm based on the concept of link reversal. TORA improves the partial link reversal method by detecting partitions and stopping non-productive link reversals. TORA can be used for highly dynamic mobile ad hoc networks. Route maintenance operation is an important part of TORA. TORA has the unique feature that control messages are localized into a small set of nodes near the occurrence of topology changes. After a node loses its last downstream link, it generates a new reference level and broadcasts the reference to its neighbors.

VII. COMPARATIVE ANALYSIS

Table 1: Performance comparison of four kinds of routing protocols for ad hoc Networks

Metrics	Protocols		
	AODV	DSR	TORA
Jitter	1	4	2
Loss Ratio	1	3	4
Throughput	1	3	4
Routing Load	3	2	1
Scalability	3	2	1
Connectivity	1	2	4
Supporting Multicast	Yes	No	No*

Note: NO* denotes TORA itself does not support broadcasts, but LAM, Which moves above the TORA, supports broadcasts.

VIII. CONCLUSION

This paper discusses the simulation model for the variable network size and whose mutual connection in the network topology, it is appropriate to use the model to appraise the scalability and the ability to support QoS of the above four kinds of protocols for ad hoc network. The related works (see Section 1) use the simulation model with a constant network size and a varying pause time. We use the different simulation model and more metrics (see the mobile ad hoc networks have been a subject of quite a number of investigations in recent years. Most of these investigations have been motivated by the need to design an efficient routing protocol for an ad hoc network. A good routing protocol needs to provide reliability and energy efficiency with low control overhead. To ensure reliability, load balancing and QoS, multipath routing protocols have been proposed for MANET. This paper presented a survey of most recent multipath routing protocols for MANETs. The surveyed protocols showed that multipath routing can improve network performance in terms of delay, throughput, reliability and life time. Yet it is hard to find a single protocol or a set of protocols that can improve all these performance parameters. Selection of a multipath routing protocol depends on a particular application and trade- offs. Some of the objectives are energy efficiency, low overhead, reliability and scalability. With this survey paper, researchers can acquire what has been investigated, and network designers can identify which protocol to use, and what is the trade-offs.

REFERENCE

[1] Broch J, Johnson DB, Maltz DA. "The dynamic source routing for mobile ad hoc networks". IETF Internet-draft, draft-ietf-manet-dsr-00.txt; 1998.
[2] Perkins CE, Bhagwat P. "Highly dynamic destination sequence distance vector (DSDV) routing for mobile computers". In: Proceedings of the ACM SIGCOMM, London, UK, 1994.
[3] Anurag K, Manjunath D, Kuri J. "Communication networking: an analytical approach". Los Altos, CA: Morgan Kaufmann Publishers; 2004. p. 715–6.
[4] Bertsekas D, Gallager R. Data networks, 2nd ed. "Englewood Cliffs, NJ: Prentice-Hall"; 1992 p. 162–9.
[5] Tsirigos A, Haas ZJ, Tabrizi SS. "Multipath routing in mobile ad hoc networks or how to route in the presence of frequent topology changes". In: Proceedings of the military communications conference, vol. 2, Vienna, Virginia, October 2001, p. 878–83.
[6] Huang X, Fang Y. "End-to-end delay differentiation by prioritized multipath routing in wireless sensor networks". In: Military communications conference, MILCOM 2005, vol. 2, p. 1277–83
[7] Zeng K, Ren K, Lou W. "Geographic on-demand disjoint multipath routing in wireless ad hoc networks". In: Military communications conference, MILCOM 2005, p. 1–7
[8] Ye Z, Krishnamurthy SV, Tripathi SK. "A framework for reliable routing in mobile ad hoc networks". In: Proceedings of the 22nd annual joint conference of the IEEE computer and communications societies (INFOCOM), vol. 1, 2003, p. 270–80.
[9] Liang Y, Midkiff SF. "Multipath Fresnel zone routing for wireless ad hoc networks". In: Proceedings of the IEEE wireless communications and networking conference, vol. 4, March 2005, p. 1958–63.