www.ijecs.in
International Journal Of Engineering And Computer Science ISSN:2319-7242
Volume 5 Issue 09 September 2016 Page No.17967-17970

Comparison Of Routing Protocols (DSDV, DSR and AODV) In Manets

Shikha Sharma[1st] Manish Mahajan[2nd]
Research Scholar
CGC College of Engineering
Landran Road, Mohali, India
E-mail: shikha.sharma503@gmail.com
Head of Department
COE College of Engineering
Landran Road, Mohali, India
E-mail: cgccoe.hodcse@gmail.com

Abstract: ***A mobile ad hoc network (MANET) is a collection of mobile nodes that is joined through wireless medium forming rapidly changing topologies. MANET's are infrastructure-less and can be set up anytime, anywhere. The survey of protocol properties has been conducted of various MANET routing algorithms and analyzed them. The routing algorithms are categorized into two i.e. proactive (table driven) and reactive (on demand). The algorithms considered are DSDV, DSR, and AODV. The comparison of these three routing protocols are based on the various protocol parameters such as Route Discovery, Network Overhead, Periodic Broadcast, Node overhead etc.***

Keywords: *AODV, DSDV, DSR, MANETs.*

I. INTRODUCTION

A Mobile Ad Hoc Network (MANET) is an independent system of mobile nodes with routing abilities linked by wireless links, the union of which forms a communication network [1]. Therefore, it can be reflected as a temporary infrastructure less network formed by a set of wireless mobile hosts that vigorously establish their own network on the fly without relying on any central administration [2]. All participants at these networks act as both hosts and routers forming an autonomous network heavily depended on the belief that all participants give and take resources in a fairly manner. The nodes are usually devices with limited CPU, storage and energy resources such as laptops, PDAs and other mobile devices. The features can be broadly classified in terms of connectivity, bandwidth and battery lifetime etc. Moreover, we can definitely understand the serious challenges that exist in the implementation of MANETs. The foremost features of MANETs, which have a significant impact on both the quality of services and the security, are presented in [3] and are as follows:

- Infrastructure-less
- Wireless Link Use
- Limited Bandwidth
- Multi-hop
- Node Movement Autonomy
- Amorphous
- Power Limitations

A. Security Issues and Challenges

security is an essential service for wired and wireless network communications. The success of mobile ad hoc networks (MANET) intensely depends on people's confidence in its security. However, the features of MANET pose both challenges and opportunities in accomplishing security goals, such as confidentiality, authentication, integrity, availability, access control, and non-repudiation. The necessity for security in MANET is very high because there is no stationary infrastructure for the network and the nodes are mobile with open and dynamic structure. The most important parameters that security depends on are authentication, integrity, confidentiality, availability and non-repudiation [4]. The wireless ad-hoc networks requires more protection because it is exposed to attacks by design. The usage of wireless links makes an ad-hoc network more prone to attacks ranging from passive eavesdropping to active interfering [5]. Unlike in wired networks, where an enemy must gain physical entrance to the network wires or pass through the several lines of defence like firewalls and gateways. When compared to a wired network, it's easier to attack a wireless network because of its configuration and also the attack may arise in any direction and any node can be attacked at any point of time. MANETs are more vulnerable to attacks because:

- Limited Computational Capabilities
- Limited Power Supply

- Challenging Key Management

B. Classification of Routing Protocols

Classification of routing protocols in mobile ad hoc network can be done in numerous ways, but most of these are done reliant on routing scheme and network arrangement. The routing protocols can be classified as flat routing, hierarchical routing and geographic position assisted routing while depending on the network structure. According to the routing strategy routing protocols can be classified as Table-driven and source initiated.

Proactive Routing Protocols: Proactive Routing protocols are also called as table-driven protocols and will dynamically determine the outline of the network. Through a regular interchange of network topology packets between the nodes of the network, at every single node an complete picture of the network is maintained. There is hence negligible delay in defining the route to be taken. This is especially important for time-critical traffic. When the routing information becomes valueless quickly, there are many short-lived routes that are being determined and not used before they turn illegal. Therefore, another disadvantage causing from the increased movement is the amount of traffic overhead created when calculating these unnecessary routes. This is exclusively transformed when the network size increases. Lastly, if the nodes transmit infrequently, most of the routing information is considered terminated. The nodes, however, continue to consume energy by continually updating these unused entries in their routing tables as mentioned, energy conservation is very important in a MANET system design. Therefore, this extreme expenditure of energy is not desired. Thus, proactive protocols works best in networks that have low node movement or where the nodes transfer data frequently. E.g. DSDV (Destination-Sequenced Distance Vector).

Reactive Routing Protocols: The mobility of the nodes causes the topology of the network to change continually. Too many resources are used for signaling and it is a difficult task to keep the track for this type of topology. Reactive routing protocols were planned for these types of environments. These are based on the plan that there is no point on trying to have an image of the entire network topology, since it will be continuously changing. Instead, whenever a node needs a route to a given target, it initiates a route discovery process on the fly, for discovering out a pathway. Reactive protocols start to set up routes on-demand. The routing protocol will try to establish such a route, whenever any node wants to initiate communication with another node to which it has no route. This kind of protocols is usually based on flooding the network with Route Request (RREQ) and Route reply (RERP) messages. By the help of Route request message the route is discovered from source to target node; and as the target node gets a RREQ message it send RERP message for the confirmation that the route has been established. This kind of protocol is usually very effective on single-rate networks. It usually minimizes the number of hops of the selected path. However, on multi-rate networks, the number of hops is not as important as the throughput that can be obtained on a given path. E.g. Dynamic Source routing protocol.

II. DESTINATION SEQUENCED DISTANCE VECTOR ROUTING PROTOCOL

The Destination-Sequenced Distance-Vector (DSDV) Routing Algorithm is based on the idea of the classical Bellman-Ford Routing Algorithm. Routing Loop problem is solved which is present in Bellman-Ford algorithm. To solve the routing loop problem, this routing makes use of sequence numbers. Each mobile node maintains a routing table that includes the number of hops to reach the destination, all available destinations and the sequence number tagged by the destination node. The sequence number is used to distinguish stale routes from new ones and thus avoid the formation of loops. So, the update is both time-driven and event-driven. A "full dump" or an incremental update technique is used to update the routing table.

A full dump sends the full routing table to the neighbors and could span many packets whereas in an incremental update only those entries from the routing table are sent that has a metric change since the last update and it must fit in a packet. When the network is relatively stable, incremental updates are sent to avoid extra traffic and full dump are relatively infrequent .If there is space in the incremental update packet then those entries may be included whose sequence number has changed. DSDV protocol guarantees loop free paths and Count to infinity problem is reduced in DSDV.

III. DYNAMIC SOURCE ROUTING PROTOCOL

DSR uses source routing concept. When packets are flooded by a source node, the sender node caches complete hop-by-hop route to the receiver node. These route lists are caches in a route cache. The data packets carry the source route in the packet header. DSR uses Route Discovery process to send the data packets from sender to receiver node for which it does not already know the route, it uses a route discovery process to dynamically determine such a route. In Route discovery DSR works by flooding the data packets in network with route request (RREQ) packets.

RREQ packets are received by every neighbour nodes and continue this flooding process by retransmissions of RREQ packets, unless it gets destination or its route cache

DOI: 10.18535/ijecs/v5i9.29

consists a route for destination .Such a node replies to the RREQ with a route reply (RREP) packet that is routed back to real source node .source routing uses RREQ and RREP packets. The RREQ builds up the path traversed across the network. The RREP routes itself back to the source by traversing this path toward the back. The source caches backward route by RREP packets for upcoming use. If any connection on a source route is wrecked, a route error (RERR) packet is notified to the source node.

IV. ADHOC ON DEMAND DISTANCE VECTOR ROUTING PROTOCOL

AODV uses a very special technique to maintain routing information. AODV protocol is both an on-demand and a table-driven protocol. It adopts flat routing tables, one entry per destination. It is in difference to DSR, which can maintain multiple route cache entries for every one destination.

Unlike DSR The packet size in AODV is uniform. In AODV there is no need for system-wide broadcasts due to local changes, unlike DSDV.AODV has multicasting and uncasing routing protocol property within a uniform framework. Source node, destination node and next hops are addressed using IP addressing. AODV builds routes using a route request /route reply cycle. To determine freshness of routing information and to prevent routing loops, AODV uses sequence numbers maintained at each destination. Sequence number for both destination and source are used. These sequence numbers are carried by all routing packets. Maintenance of timer-based states in each node, regarding use of individual routing table entries is an important feature of AODV. If routing table entry is not used recently then routing table entry is expired. When the next-hop link breaks nodes are notified with RERR packets. Each predecessor node, forwards the RERR to its own set of predecessors, thus effectively erasing all routes using the broken link.. Route error propagation in AODV can be visualized conceptually as a tree whose root is the node at the point of failure and all sources using the failed link as the leaves. It is loop free, self-starting, and scales to large numbers of mobile nodes.

V. COMPARISON

S.NO.	PROTOCOL PARAMETERS	DSDV	DSR	AODV
1.	Table driven/ Source Routing	Table driven	Source Routing	Table driven and Source Routing
2.	Need of Hello Message	Yes	No	Yes
3.	Route Discovery	Periodic	On Demand	On Demand
4.	Route Mechanism	Route Table with next hop	Complete Route Cached	Route Table with next hop
5.	Network Overhead	High	Low	Medium
6.	Node Overhead	Medium	High	Medium
7.	Multi-Hop Wireless Support	Yes	Yes	Yes
8.	Loop Free	Yes	Yes	Yes
9.	Multiple Routes	No	Yes	No
10.	Route Discovery	No	Yes	Yes
11.	Route Maintenance	No	Yes	Yes
12.	Reactive / Proactive	Proactive	Reactive	Reactive
13.	Routing Overhead	Medium	Low	High
14.	Packet Size	Uniform	Non Uniform	Uniform

VI. CONCLUSION

This paper does the realistic comparison of three routing protocols DSDV, AODV and DSR. The significant observation is, comparison results agree with expected results based on theoretical analysis. As expected, reactive routing protocol AODV is the best considering its ability to maintain connection by periodic exchange of information, which is required for TCP, based traffic. DSR/AODV performs better than DSDV with large number of nodes. Hence for real time traffic AODV is preferred over DSR and DSDV. For less number of nodes and less mobility, DSDV's performance is superior. DSR/AODV is based on route discovery and route maintenance mechanism. Flat Routing Philosophy is used in DSR, AODV and DSDV. Packet size is uniform for DSDV; AODV. Packet size is non uniform for DSR. Loop free routing Protocol Property is available to DSR, AODV and DSDV.

DOI: 10.18535/ijecs/v5i9.29

REFERENCES

[1] Tavil B., Heinzelman W., "Mobile Ad Hoc Networks – Energy-efficient real-time data communications ", Chapter 1.1 Characteristics of MANETs, Springer, 2006.

[2] Azzedine Boukerche, Begumhan Turgut, Nevin Aydin, Mohammad Z. Ahmad, Ladislu Boloni, Damla Turgut, "Routing protocols in Adhoc network: A survey", Elsevier, Computer Network, pp. 3-32, 2011.

[3] Djenouri D., Khelladi L., Badache N., "A survey of security issues in mobile ad hoc and sensor networks" , IEEE Communications Surveys, vol. 7, issue 4, 2005.

[4] Ishrat, Z. (2011). Security issues, challenges & solution in MANET. IJCST,2(4).

[5] I. Noman and Z. A. Shaikh, "Security Issues in Mobile Ad Hoc Network," *Wireless Networks and Security*, Springer Berlin Heidelberg, pp. 49-80, 2013.