International Journal of Advanced Trends in Computer Applications
www.ijatca.com

A Review on Various Routing Protocols of Data Communication in MANET

[1]Research Scholar Yogesh Kansal, [2]Asst. Prof. Ranbir Singh
[1,2]Department of computer science and engineering
SUSCET, Tangori

Abstract: *After reviewing the literature review, The DYMO protocol has flaws and establish the route but failed to maintain route recovery. The other same issues in the case of AODV protocol [4] and AODVv2 protocols [5]. The extended version of AODVv2 (also known as DYMO) [5] i.e. proposed AODVv2-02 has been simulated using NS2.35 and its performance is analyzed with respect to various performance metrics. The basic operations of the AODVv2 protocol are route discovery and route maintenance. Route discovery is performed by multicasts a Route Request Message (RREQ) to find route towards destination and these RREQ message is retransmitted again and again whenever any node wants to transmit packets to another node in the network, but it creates unnecessary signaling traffic and interference.*

Keywords: *MANET, Classification in MANET's, AODV, DSR, DSDV, TORA.*

I. INTRODUCTION

1.1 Mobile Ad-hoc Networks (MANET)

A Mobile Ad-hoc Network (MANET) is an infrastructure less and self-governing network of mobile nodes, in which all participating nodes can freely transmit the packets through wireless transmission media to any remote node in the network. An ad hoc network doesn't have any centralized administration or server, whereas the control of the network is allocated among participating nodes. The MANET does not require any fix infrastructure such as base station. Each mobile node is an independent node, which could function both as host and router. In MANET, each node operates not only as an end system but as a router also to forward packet.

1.2 Characteristics of MANET

The various characteristics of MANET are as follows:

1. Distributed Network: There is no background network for the central control of the network operations. The control of the network is divided among the nodes. The nodes involved in a MANET should cooperate with each other and communicate among themselves and each node acts as a relay as needed, to implement specific functions such as routing and security [1].

2. Multi hop routing: When a node tries to send information to other nodes which is out of its communication range, the packet should be forwarded through one or more intermediate nodes.
3. Light-weight terminals: In maximum cases, the nodes at MANET are mobile with less CPU capability, low power storage and small memory size.
4. Self-governing nodes: In MANET, each mobile node is an independent node, which could function both as host and router.
5. Shared Physical Devices: The wireless communication medium is accessible to any node with the relevant equipment and sufficient resources. Accordingly, access to the channel cannot be restricted.

1.3 Classification of MANET Routing Protocols

The MANET routing protocols can be classified in many ways, but mostly this classification depends on routing strategy and network structure.

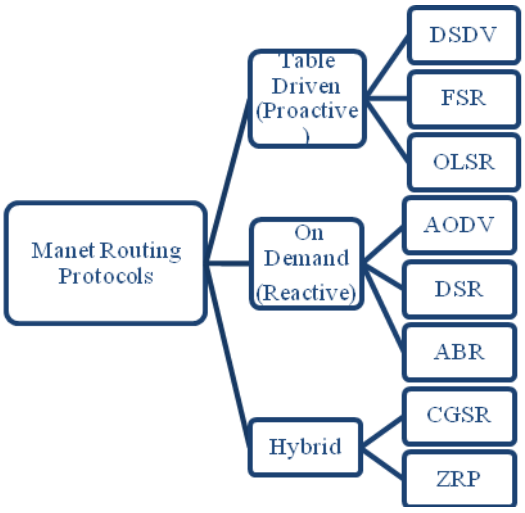

Figure 1.1: Classification of MANET Routing Protocols

The MANET does not require any fix infrastructure such as base station. In MANET, each node operates not only as an end system but as a router also to forward packet. According to the routing strategy these routing protocols can be categorized as Table-driven, On-demand and Hybrid as shown in the figure 1.1.

1.3.1 Table-Driven Routing Protocols (Proactive)
These types of protocol maintain route information from one node to every other node in the network. Each node maintains a routing table which contains routing information of the entire network. Each node updates its routing table regularly so that every node knows the route in advance. Whenever any node wants to send a message to another node then its path is already known. Thus, if a route is already known before actual traffic arrives, then transmission starts without delay. Other-wise, message packets should wait in queue until a node receives routing information from source to destination. These protocols generally use link-state algorithms which help to maintain and update a routing table by flooding the link information about neighbor nodes. It creates more overhead in routing table to maintain and update the node information entries for each and every node in the network.
Examples of table-driven routing protocols are:

- Optimized Link State Routing (OLSR)
- Destination-Sequenced Distance Vector (DSDV)
- Fish-eye State Routing (FSR)

1.3.2 On-Demand Routing Protocols (Reactive)
In reactive protocols, there is no need to maintain any routing information between nodes in the network, when there is no communication or the network is idle. Whenever any node wants to send packets to another node in the network. This process runs until routing information is determined or all possible permutations have been investigated. Once a route has been determined, it is maintained by a route maintenance process until the route is no longer required or the destination becomes inaccessible to every path from the source. Therefore, theoretically the communication overhead is decreased due to route research [4].
Examples of table-driven routing protocols are:

- Ad-hoc On-Demand Distance Vector (AODV)
- Dynamic Source routing protocol (DSR)
- Dynamic MANET on-demand routing protocol (DYMO)

1.2.3 Hybrid Routing Protocols
Hybrid protocols integrate the features of both proactive as well as reactive protocols [4]. It is a combination of proactive and reactive routing and is based upon distance vector protocol but also contain many features and advantage of link state protocol. Hybrid protocol enhances interior gateway routing protocol. The difficulty of all hybrid routing protocols is how to organize the network according to network parameters.
Examples of table-driven routing protocols are:

- Zone Routing Protocol (ZRP)
- Cluster-head Gateway Switch Routing Protocol (CGSR)

II. REVIEW OF LITERATURE

Salim EL KHEDIRI et al. (2014) [1] have worked on performance of three types of Mobile Ad-hoc network routing protocols using NS2 Simulator and Comparison of Ad-hoc On-demand Distance Vector (AODV), Dynamic Source Routing (DSR), Destination-Sequenced Distance Vector (DSDV) Protocols. They have the Throughput, Packet delivery Fraction (PDF), Average End-to-End delay and Energy Consumption per Delivered Packet by varying the number of nodes.
Anuj K. Gupta et al. (2013)[2] simulated and analyzed performance of existing DYMO routing protocol on various simulation metrics. The simulation has been performed with changing pause times. The results show that DYMO performs better in all terms than AODV.
L. Raja et al. (2013)[3] introduced various reactive routing protocols Ad-hoc On Demand Distance Vector (AODV), Temporally Ordered Routing Algorithm (TORA), Dynamic Source Routing (DSR) protocols and a comparison of these classes of routing protocols. Also describe the basic actions of the protocols with their advantages and disadvantages related to the routing process.
Manjeet Gupta et al. (2013) [4] make a comparison of these routing protocol based on the performance metrics like packet delivery fraction, end–to–end delay and throughput. Simulation is used to compare the performance of AODV, OLSR and TORA. NS2 (Network Simulator version2) is used as simulator. With the help of ns-2, result shows that AODV's performance in PDF and throughput metrics is better

than OLSR and TORA. For end-to-end delay metrics TORA perform better than OLSR and AODV.

C. Perkins et al. (2013) [5] explained the revised Ad Hoc On-Demand Distance Vector (AODVv2) routing protocol. AODVv2 determines unicast routes among AODVv2 routers within the network in an on demand fashion, offering an on-demand convergence in dynamic topologies.

Anuj K. Gupta et al. (2013) [32] is subjected to the on-demand routing protocols with identical loads and environment conditions and evaluates their relative performance with respect to the two performance metrics: average End-to-End delay and packet delivery ratio. They investigated various simulation scenarios with varying pause times. From the detailed simulation results and analysis.

III.APPROACHES USED

3.1 Hardware / Software Setup

The simulation of network has been executed on separate machines so as to understand the varying effects of the supporting hardware had on the simulation experience. Table 4.1 shows the Hardware/Software setup for the simulation.

Table 3.1: The Hardware / Software Setup

Operating System	UBUNTU 12.04
Processor	Intel Core 2 Duo
Memory	2GB
Compiler	Gcc
Simulation Environment	NS2
INET Framework	INET 2.99
Simulated using	NS 2.35

3.2 Protocols Used:

AODV: The AODV protocol sends many small packets compared to other reactive protocols such as DSR. Hence when the network's size increases, the degree of node also increases, causing network congestion. The use of clustering reduces this overhead by allowing localized route discovery and maintenance. The proposed Cluster- AODV scheme uses clustering architecture and AODV functionalities to perform routing. In this section, we will discuss the mechanisms used by Cluster-AODV to reduce routing overhead and allow scalability while achieving a good packet delivery ratio.The AODV is one of the reactive routing protocols most commonly used in MANETs. By using AODV route construction and maintenance mechanisms, clustering architecture can be constructed on demand. Clusters are maintained when data are to be sent. Such an integrated routing and clustering scheme can improve throughput and reduce routing overhead.

DSR: Dynamic Source Routing (DSR) is a routing protocol for wireless mesh networks. It is similar to AODV in that it forms a route on-demand when a transmitting node requests one. However, it uses source routing instead of relying on the routing table at each intermediate device. Determining source routes requires accumulating the address of each device between the source and destination during route discovery. The accumulated path information is coached by nodes processing the route discovery packets. The learned paths are used to route packets. This protocol is truly based on source routing whereby all the routing information is maintained (continually updated) at mobile nodes. It has only two major phases, which are Route Discovery and Route Maintenance. Route Reply would only be generated if the message has reached the intended destination node (route record which is initially contained in Route Request would be inserted into the Route Reply).

Dedicated short-range communications (DSRC): Dedicated short-range communications are one-way or two-way short-range to medium-range wireless communication channels specifically designed for automotive use and a corresponding set of protocols and standards. DSRC/WAVE is the only wireless technology that can potentially meet the extremely short latency requirement for road safety messaging and control. The unique feature of low latency secures the role of DSRC, as an essential communication technology, in future CALM networks that will make use of multiradios on multi-bands. However, the current DSRC solutions are not fully field proven. There are significant DSRC-related social and technical challenges that have to be dealt with before large-scale deployment.

Destination sequenced distance vector routing (DSDV): DSDV is adapted from the conventional Routing Information Protocol (RIP) to ad hoc networks routing. It adds a new attribute, sequence number, to each route table entry of the conventional RIP. Using the newly added sequence number, the mobile nodes can distinguish stale route information from the new and thus prevent the formation of routing loops. Packet Routing and Routing Table Management in DSDV, each mobile node of an ad hoc network maintains a routing table, which lists all available destinations, the metric and next hop to each destination and a sequence number generated by the destination node.

TORA (Temporally ordered routing): The TORA attempts to achieve a high degree of scalability using a "flat", non-hierarchical routing algorithm. In its operation the algorithm attempts to suppress, to the greatest extent possible, the generation of far-reaching control message propagation. In order to achieve this, the TORA does not use a shortest path solution, an approach which is unusual for routing algorithms of this type. TORA builds and maintains a Directed Acyclic Graph (DAG) rooted at a destination. No two nodes may have the same height. Information may flow from nodes with higher heights to nodes with lower heights. Information can therefore be thought of as a fluid that may only flow downhill.

V. CONCLUSION

A Mobile Ad-hoc Network (MANET) is an infrastructure less and self-governing network of mobile nodes. The basic operations of the AODVv2 protocol are route discovery and route maintenance. Route discovery is performed by multicasts a Route Request Message (RREQ) to find route towards destination and these RREQ message is retransmitted again and again whenever any node wants to transmit packets to another node in the network, but it creates unnecessary signaling traffic and interference. In order to avoid this retransmission of redundant or duplicate RREQ Messages, AODVv2-02 maintains Received RREQ table, so that no two RREQ messages are comparable if they are generated by same AODVv2-02 router for same destination.

In last we will evaluate and compare proposed protocol that is AODVv2-02 with existing protocols AODV and DYMO on the basis of QoS Parameters like Throughput, Packet Delivery Ratio (PDR), Delay and Jitter.

REFRENCES

[1] Anuj K. Gupta, Harsh Sadawarti and Anil K. Verma, "Review of Various Routing Protocols for MANETs", International Journal of Information and Electronics Engineering, Vol. 1, No. 3, 2011.

[2] Jatinder pal Singh and Anuj Kumar Gupta "A Review on Dynamic MANET on Demand Routing Protocol in MANETs" International Journal of advance trends in Computer Science and Engineering, ISSN No. 2278-3091, Volume 2, No.2, 2013.

[3] C. E. Perkins, S.Ratliff, J.dowdell, "Dynamic MANET On-Demand (AODVv2) Routing", Internet Draft, draft-ietf-manet- aodvv2-02, work in progress, 2013.

[4] Anuj K. Gupta, Dr. Harsh Sadawarti and Dr. Anil K. Verma, "Performance analysis of AODV, DSR & TORA Routing Protocols", ISSN: 1793-8236 IACSIT International Journal of Engineering and Technology, Vol.2, No.2, 2010.

[5] Manjeet Gupta and Sonam Kaushik, "Performance Comparison Study of AODV, OLSR and TORA Routing Protocols for MANETS", International Journal of Computational Engineering Research / ISSN: 2250–3005 IJCER | 2013 | Vol. 2 | Issue No.3 |704-711 Page 704.

[6] Narendran Sivakumar, Satish Kumar Jaiswal, "Comparison of DYMO protocol with respect to various quantitative performance metrics", IRCSE, 2009.

[7] Nehal Jadeja and Roma Patel, "Performance Evaluation of AODV, DSDV and DSR Routing Protocols Using NS-2 Simulator", International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622 www.ijera.com Vol. 3, Issue 2, 2013, pp.1825-1830.

[8] Nitin Kumar, KunjVashishtha, Kishore Babu, "A Comparative Study of AODV, DSR, and DYMO routing protocols using NS2", International Journal on Recent and Innovation Trends in Computing and Communication, 2013, Volume: 1, Issue: 9, pp. 735-739.

[9] NS2 Documentation and Tutorial , http://www.omnetpp.org/ documentation.

[10] Priyanshu and Ashish Kumar Maurya, "Survey: Comparison estimation of various routing protocols in mobile ad hoc network", International Journal of Distributed and Parallel Systems (IJDPS), Vol.5, No.1/2/3, 2014.

[11] Protocols", International Journal of Engineering Research and Applications (IJERA), pp. 10-15, 2014.

[12] Salim EL KHEDIRI, Nejah NASRI, Awatef BENFRADJ, Abdennaceur KACHOURI, Anne WEI "Routing Protocols in MANET: Performance Comparison of AODV, DSR and DSDV Protocols Using NS2", IEEE, Vol. 8, Issue 12, 2014.