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# A Survey Paper on Performance of Routing Protocols in Wireless Ad-Hoc Network

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***Abstract*— Mobile Ad-hoc network (MANET) is an imperative technology in last decade. MANETs are highly vulnerable to attacks due to infrastructure less and decentralized network. This survey paper provides an outline of these protocols by presenting their individuality, functionality and their relative analysis to be evaluated the performance. This study experimentally compares the performance of single hop, multi hop neighbor set and multi point relay set of Optimized Link State Routing (OLSR). In addition the performance of the routing protocols in wireless ad-hoc networks such as AODV, DSDV, ODMR, ZRP and OLSR. This study concludes that OLSR is to increase the throughput, reduces the packet drop and highly improves the QoS support.**

***Keywords*— MANET, OLSR, Single hop neighbor set, Multi hop neighbor set, Multipoint relay set, Routing protocols.**

## I. INTRODUCTION

In a MANET, the router connection will be change frequently that will leading to the multi-hop communication that can allow communication without use of BS/AP and alternative connections within internetwork. A MANET is a mobile ad hoc network so that can change its location, configure itself on the network. All the nodes in the networks will be mobile and they use wireless connections to communicating. Routing is one of the major problems of networking for sending data from single node to other node. A mobile ad-hoc network is called Mobile ad-hoc multi hop networks without predetermined topology. Because ad-hoc network can be characterized as a dynamic topology, multi hop. Fig1. A mobile node wishes to communicate with correspondent node via the routers. These nodes associate with their nearest home agent for identifying the foreign agent. Every agent should know the status of the mobile nodes. These routing will be changed dynamically and is also known as Triangle routing.

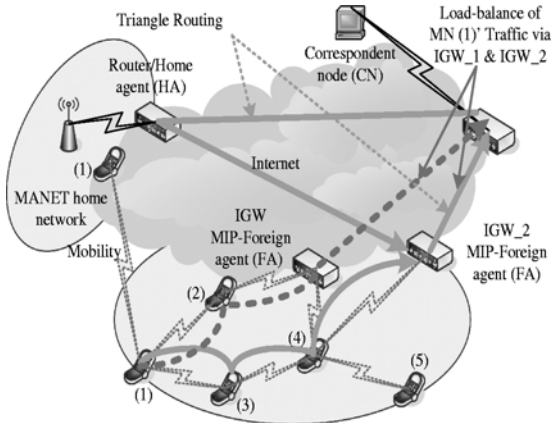
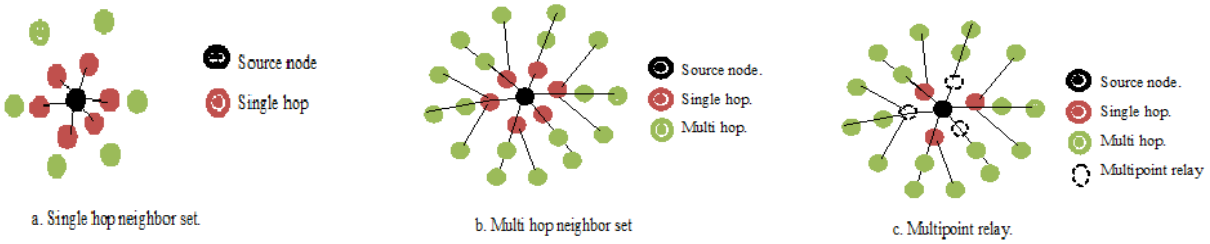



Fig 1. Mobile Ad-Hoc Network Architecture.

## II. OPTIMIZED LINK STATE ROUTING

[6] In Link State Routing, each node periodically broadcasting status of its links, and it must re-broadcasts information of link state received from its neighbors node. Every node keeps track of that information from other nodes and by the uses of above in sequence information to determine next hop to each destination. In nature OLSR protocol is proactive Protocol. Objective is to route immediately available and minimizes the flooding by using Multi Point Relay (MPR). [8] For large and dense networks OLSR protocol is suitable. Routing table has been maintaining for each node to know its destination node in the network. Each node receiving Topology Control (TC) message after that it will store connected pairs of outline (last-hop, node). Maintain routing table based on the information carried in the topology table and the neighbor table and also it contains unique ID for each node, destination address, next hop address and distance.




a. Single hop neighbor set. b. Multi hop neighbor set c. Multipoint relay.

Fig 2. Types of hopping techniques.

*A. Single hop*

A single hop neighbor set in OLSR (i.e.) choose 1-hop neighbors that cover maximum number of 2-hop neighbors[6].

| Node B | 1 Hop Neighbors A,C,F,G | 2 Hop Neighbors D,E | MPR(S) C |
|---|---|---|---|

Fig 3. OLSR_R1.

Fig 3. Node B acts a source node. Source sends information to neighbor nodes (1-hop A, C, F, and G) and next 2 hop neighbors is a D, E. Relay point is C which is selected by using maximum bandwidth.

*B. Multi hop*

A wireless network contains more wireless hops which are used to convey information from a source node to target node [8].

| Node B | 1 Hop Neighbors A,C,F,G | 2 Hop Neighbors D,E | MPR(S) F |
|---|---|---|---|

Fig 4. OLSR_R2.

[6] A multi hop neighbor set will be select neighbors node depending upon the Bandwidth efficiency of the nodes as MPRs till 2-hop neighbors node has covered. Fig 4. Here, the relay point is F which can be fluctuated than single hop neighbor set along with maximum bandwidth.

*C. Multipoint relay*

MPR aims to reduce re-transmission in the same region. [6] A set of MPR's is able to transmit to all hop neighbors. Link between mobile node and its MPR is bidirectional. Each node selects a set of MPR selectors. From that every node will making a routing table to known its destination node via its MPR nodes. Every node occasionally broadcasts list of its relay point selectors. Depend upon receiving information by MPR node, each node updating and recalculating the routing tables to know its new destination node. A Multipoint relay selects the MPRs in a way such that all the 2-hop neighbors have the maximum bottleneck BW path through the MPRs to the current node.

| Node B | 1 Hop Neighbors A,C,F,G | 2 Hop Neighbors D,E | MPR(S) A,F |
|---|---|---|---|

Fig 5. OLSR_R3.

Fig 5. The relay point is more (A, F) because of the time consumption. The periodic nature of the protocol creates a large amount of overhead. In order to condense overhead it confines the number of mobile nodes that can forward network wide traffic and for this purpose it uses MPR which is responsible for forwarding routing messages [5].

Mobility causes route change and topology changes very frequently and topology control (TC) messages are broadcasted throughout the network. Each mobile node maintains the routing table that contains routes to all reachable destination nodes. OLSR does not notify the source immediately after detecting a broken link and source node comes to know that route is broken when the intermediate node broadcasts its next packet. Fig 7. Consider Available Bandwidth. [5] In OLSR node B selecting C as its MPR behalf of that all other nodes will know that they can reach B via C. D→B route is D-C-B, whose bottleneck bandwidth is 3. Fig 8. Optimal route i.e., path with maximum bottleneck bandwidth: D-F-B (BW 10). QoS support of OLSR does not guarantee to find the best bandwidth route.

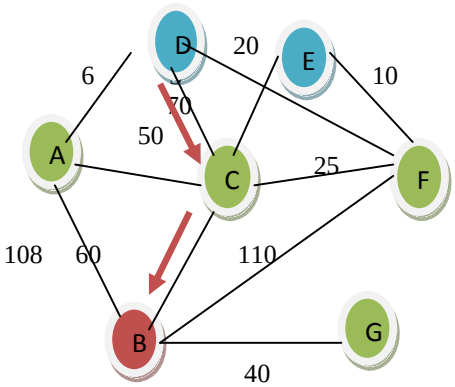



Fig 7. Example for MPR selection in OLSR

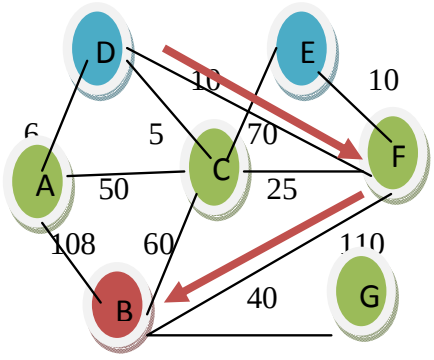



Fig 8. To find the optimal route

## III. VARIOUS TYPES OF ROUTING PROTOCOLS

### *A. Ad-Hoc On Demand Distance Vector (AODV)*

[9] An AODV is one of the routing protocols under study by MANET and the typical protocol of on-demand types. In AODV, each node has the routing table and the freshness of routes is ensured with the sequence number of each the routing information. When each node receives a control packet that occurred in on-demand, the routing table is updated based on the sequence number or the number of hops. If a route to a destination is needed it is established at the route discovery phase and is maintained at the route maintenance phase [2]. It constructs route on demand and aims to reduce routing load. It uses a table driven routing framework, destination sequence numbers for routing packets to destination mobile nodes and has location independent algorithm [5]

It performs route discovery using control message route request (RREQ) and route reply (RREP), whenever node wishes to send packet to destination. To control network wide broadcast of RREQs, the source node uses an expanding ring method [4]

When each node receives the RREP, it creates a forward route to the destination node and it forwards the RREP to the reverse route. When the RREP arrives at the source node along with the reverse route, it updates the forward route and starts communications [2]

### *B. Destination Sequenced Distance Vector (DSDV)*

In DSDV network maintaining routing tables for each node, which having all the possible destinations and the number of hops to them in the network are recorded. This number is also associated with each route to the destination [4] DSDV is to address the looping problem of the conventional distance vector routing protocol and to make the distance vector routing more suitable for ad-hoc networks routing. It arises route fluctuation because of its criteria of route updates. At the same time, it does not solve the common problem of all distance vector routing protocols, the unidirectional links problem [1].

QoS Support with DSDV:

The requirements for this: (i) Band reservation- It should allocate bandwidth at call setup time in order to support real time connections. (ii) QoS routing- To support QoS for real time traffic, the mobile nodes not only need to know the minimum delay path to destination but also have the knowledge of the BW available on that path.

### *C. Zone Routing Protocol (ZRP)*

In an ad-hoc network, it can be assumed that the largest part of the traffic is directed to close by nodes. Therefore, ZRP reduces the proactive range to a zone centered on each node [3]. It takes the advantage of both proactive and reactive protocols, for proactive these discovery within a node's local neighborhood Intrazone Routing Protocol (IARP) then the reactive protocol can be used to communicate between the global neighborhoods Interzone Routing Protocol (IERP). The responsible for the route request forwarding is Broadcast Resolution Protocol (BRP). It divides its network in dissimilar zone. In this zones may be multiple overlapping for each node, with different size for each node. Radius of length for each node is given, where perimeter of zone for the number node [3]

A Media access control protocols may be use by node to know about the next direct neighbors and also requires a Neighbor Discovery Protocol (NDP) to finding the neighbors node in efficient way.

| Protocol | DSDV | AODV | ZRP | OLSR |
|---|---|---|---|---|
| Unicast routes | No | No | Yes | Yes |
| Multicast routes | No | Yes | No | Yes |
| Periodic broadcast | Yes | Yes | No | Yes |
| Distributed | Yes | Yes | Yes | Yes |
| Unidirectional link support | No | No | Yes | Yes |
| QoS Support | No | No | No | Yes |

Table 1.Comparison of routing protocols [7]

## IV. CONCLUSIONS

In this paper, we analyzed the performance comparison of the routing protocols in ad-hoc network. In wireless ad-hoc network there is no QoS support in distance vector and hybrid routing protocols. An effort has been made to focus on QoS in optimized link state routing protocol with selection of hopping techniques such as single-hop and multi-hop. Moreover, study results show that OLSR protocol can exposed to increase the throughput and reduces the packet drop.

## REFERENCES

[1] Guoyou He"Destination-Sequenced Distance Vector (DSDV) Protocol", Networking Laboratory,Helsinki University of Technology.

[2] Abolfazl Akbari, Mehdi soruri and Ali Khosrozadeh "A New AODV Routing Protocol in Mobile Adhoc Networks, ,Islamic Azad University Ayatollah Amoli Branch, Amol, Iran Islamic Azad University Science and Research Branch, Tehran, Iran *World Appl. Sci. J., 19 (4): 478-485, 2012.*

[3] Nicklas Beijar, "Zone Routing Protocol (ZRP)" Networking Laboratory, Helsinki University of Technology,P.O. Box 3000, FIN-02015 HUT, Finland.

[4] Ginni tonk, indu kashyap,s,s.tyagi, "Performance comparison of ad-hoc network routing protocols using ns-2.

[5] Thakare p.p, joshi M.A. and Raut A.D "A review paper on routing protocols of wireless ad-hoc network technology",.,Department Of Computer Science, Jawaharlal Darda Institute Of Engineering and Technology, Yavatmal ,Ms,India,International Journal Of Networking, Issn:2249-278x & -Issn: 2249-2798, Volume 2, Issue 1, 2012.

[6] Qamar Abbas Tarar, Optimized Link State Routing Protocol for Ad Hoc Networks "Mobile ad-hoc networks based on wireless LAN".

[7] S.A .Ade , P. A. Tijare, "Pertformance comparision of AODV, DSDV, OLSR and DSR Routing protocols in Mobile Ad Hoc

Networks, International Journal of Information technology and Knowledge Management July-December 2010, Volume 2, No. 2, pp. 545-548.

[8] Prof. Robert W. Health Jr. "Wireless Networking and communication Group".

[9] Ali Khosrozadeh, Abolfazle Akbari, Maryam Bagheri and Neda Beikmahdavi, Department of Computer Engineering Ayatollah Amoli Branch Islamic Azad University,Amol,Iran "A New Algorithm AODV Routing Protocol in Mobile ADHOC Networks" *International Journal of Latest Trends in Computing* IJLTC, E-ISSN: 2045-5364, Vol-2 No 3 September, 2011.

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