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COMPARATIVE STUDY AND ANALYSIS OF AODV AND OLSR PROTOCOLS IN MESH NETWORKS

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ABSTRACT

Wireless mesh Network is an emerging area in the field of Networking and it has been applying in Mobile commerce, entertainment and education. This topology defined not only networking devices but interfaces with hardware and software for calculating frequency, bandwidth and network load. This paper highlighted the Ad Hoc on demand protocol i.e. reactive protocol for managing routing table, path and Node management. The other protocol named optimized link state routing protocol had used to update and maintained the routing table whenever changing the routing topology. The IEEE 802.11 standard has been studied and deploying with these protocol for comparing and optimized the performances of the network. The proactive protocol refers to OLSR protocol had many advantages over AODV protocol because this protocol work under many critical conditions like topology change, buffer overflow and routing table management. The paper covers the all terms related to wireless mesh networks and found that OLSR protocol gives better results than Ad Hoc on demand distance vector routing protocol.

Keywords: Mesh, AODV, OLSR, 802.11, Routing Table.

I. INTRODUCTION

Wireless network explore number of wireless devices such as PDA, laptops, personal computers and many more that possibly communicates with other devices for exchanging of information and messages all over the network as discussed in figure 1. There are numerous types of wireless that described in the table 1.

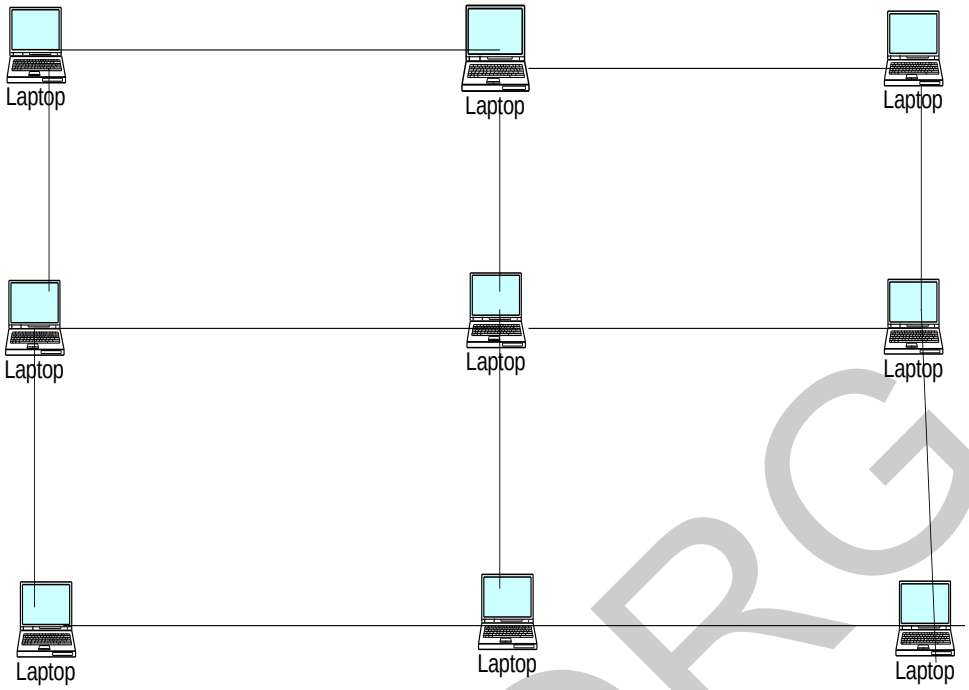

Fig. 1: Wireless Mesh Nodes

Table 1: Wireless Network Types

Types	**Area**	**Standard**
Wireless LAN	Within Campus, building	IEEE 802.11
Wireless MAN	Within City	IEEE 802.16
Wireless WAN	Worldwide	2G, 3G Systems
Wireless PAN	Peer to peer	Bluetooth, IEEE 802.15

(i) Packet forwarding

The Routing Request messagesends by the sender node for periodicallylocating the neighbor nodes and in turn their neighbor with a location and sendingrouting request.After the whole process, the actual data had transmitted both of directions.

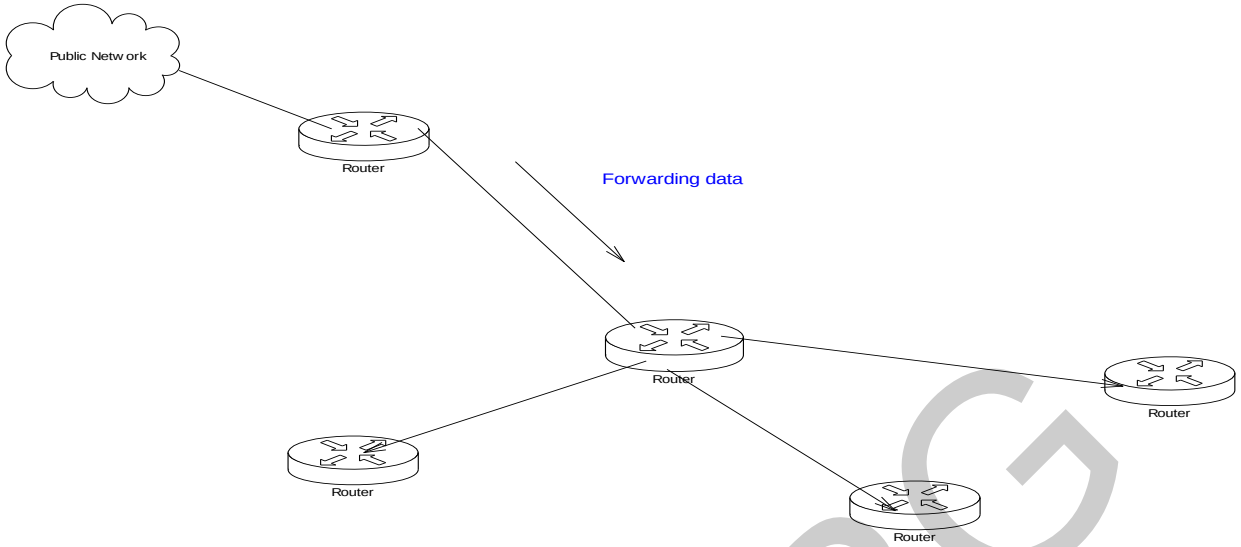

Fig. 2: Forwarding Algorithm implement in Mesh Based Networks

The forwarding algorithm (shown in figure 2) implements in the whole scenario and deploying the protocol like OLSR and AODVfor probe the shortest average hop distance from source to destination. In this case, the set of potential nodes may include only thosein direct communication range from the current node or also the set of possible nodesin the route to the destination.This packet contains the following information tospecify a flow together with a certain service level i.e. explained in table 2:

Table 2: Packet Fields

Source Address	Source Port	Destination Address	Destination Port	Protocol ID	Identification Number

In the next section we have describe the rebroadcasting that helps to forward the packets in the entire network [2].

(ii) Rebroadcasting

The following points were describing the rebroadcasting that occurred in forwarding data.

1. Probability-Based. Probabilistically, a node decides whether or not to rebroadcast.This approach blindly eliminates rebroadcasts: It may not eliminate redundantbroadcasts, or it may eliminate critical ones.

2. Counter-Based. If a certain number of previous rebroadcasts were heard, anadditional one is probably not needed based on the geometric argument theydeveloped. Thus, if the threshold of overhead transmissions is reached, thepacket is not rebroadcast.

3. Distance-Based. Assuming that the distance of the node from whom we receivea rebroadcast can be determined, the following criterion can be used to decidewhether to eliminate a packet or not. If the distance exceeds a certain threshold,the non-overlapping area is significant and the packet can be rebroadcast;otherwise the packet is not rebroadcast.

(iii) Reactive and Proactive Protocol

(a) Reactive Protocol: This protocol is on demand driven routing protocol that find the shortest path between two or more nodes present on the network. The routing request (RREQ) and Routing Reply (RREP) has been used to initialize the connection after that Hello packet information was send by the initiator node. This protocol has kept the whole routing information in the routing table. The protocols AODV and DSR are underlying the category of Reactive protocol [5].

(b) Proactive Protocol: This protocol maintains the fresh list of routing table, it makes the entry in the routing table and updated this routing information to every present node in the network. This proactive protocol is known as Table-Driven routing protocol that periodically updated information by applying control messages. The proactive protocols are OLSR (Optimized Link State Routing Protocol), OSPF (Open shortest path first).

II. Literature Survey

Hogie, et.al. (2006) described the Mobile Ad Hoc network and simulation process in Network simulator 2 and Glomosimsoftware.The authors described the MANETs simulators and associated simulation techniques.

Johnson, et. al (2007)describes the Dynamic Source routing protocol (DSR) i.e. deployed on the network and applying on the IP protocol version 4. This paper describes the behavior of Mobile Ad Hoc nodes in the network and increase internet connectivity through this protocol version.

Manjeet Gupta, SonamKaushik (2012)described AODV, OLSR and TORA protocols and interfaces with Mobile Ad Hoc networks (refers to MANETs). The paper described the performance issues in Ad Hoc based network and these issues solved by the author by taking similar scenario but definition of protocol was different. The traffic type mentioned in this paper was constant bit rate (CBR) and packet size limit to 512 Bytes only. For these input simulation parameters the authors had observed that end to end delay comparatively less in the case of OLSR and therefore sending limit of packets is high.

Dilpreet Kaur, Naresh Kumar (2013) had discussed and compares the different protocols that cover under reactive and proactive protocols. The authors was describing the AODV, OLSR, DSDV, DSR and TORA protocols; these protocols having own advantages and limitations for deploying on different network scenarios. The AODV and DSDV protocol gives better performance in the low traffic resultant maximize throughput, the DSR protocol provided maximum throughput in the dense network but OLSR and TORA comparatively better in the above said cases.

III. Existing Problem and Improved Work

Wireless networks have huge advantages over wired network; still they have limitations because of maintaining infrastructure. In any critical scenarios like disaster, military attacks, flood and cyclone, earthquake etc., the network infrastructure may breaks down. To overcome these limitations researchers work on ad-hoc networks and Mobile Ad-hoc networks. In (2006), the simulation process had done in various network simulator like Glomosim and Network Simulator 2. In (2007) the work had extended with dynamic source routing protocol and measured the performances of the network standard and Ad Hoc networks. At (2009) discuss the energy consumption issues on routing protocols. Furthermore (2010) discuss the lightweight traffic in AODV and OLSR protocol and comparative study analysis between heavy traffic.

One of the important features of this type of network is dynamically change of topologies in different time. The routing strategy in wireless mesh networks is not a simple issue. Many routing protocols for wireless mesh networks are already tested in different simulators. But still it has some limitations due to its complexity. To realize the importance of wireless mesh networks routing, in our project we are focusing especially on different wireless mesh networks routing protocols i.e. AODV and OLSR protocols.

The Ad Hoc on demand distance vector routing protocols is better in small area networks; and this AODV protocol applied on infrastructure and infrastructure-less networks. Whereas the OLSR protocol store the data in cache memory of the access point and to enable scalability and quality of the network we calculate the total cost i.e.

Total Cost= Hop Limit + TTL ------ (1)

From the equation (1), TTL is the time to live i.e. the packet time travel from source node to destination node and the hop limit count the node number where the packet routed from the neighbor nodes.

IV. Conclusion

This paper compares the Reactive and Proactive protocols by different network condition and investigated that OLSR protocol has been tremendous advantages over AODV protocol. The OLSR protocol has been following benefits that user or mobile node or laptop user continue communicating during changing topology or remodeling of the network. This OLSR protocol updates each route information when additional network device added in the network but the condition is to verify by the cluster head. At this section, OLSR appreciably reduces problems related to physical damage

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