*IOSR Journal of Computer Engineering (IOSR-JCE)*
*e-ISSN: 2278-0661, p- ISSN: 2278-8727Volume 13, Issue 6 (Jul. - Aug. 2013), PP 37-40*
*www.iosrjournals.org*

# Design Test-bed for assessing load utilising using Multicast Forwarding Approach in Wireless Mesh Networks

Kirti Dhiman[1] & Dr. Parminder Singh[2]
[1]*Research Student, Chandigarh Engineering College, Landran, Punjab, India*
[2]*Assistant Professor, Chandigarh Engineering College, Landran, Punjab, India*

***Abstract:*** *The challenges and complexities, coupled with the crucial importance of routing protocol in establishing communications among mobile nodes, build the routing space. In this kind of strategy, a node tries to forward the packet to one of its neighbours that are nearer to the destination than itself. If quite one nearer node exists, totally different selections area unit are attainable. A node selects ensuing hop for packet forwarding by mistreatment the physical position of its one-hop neighbours and therefore the physical position of the destination node. If the packet is retransmitted by some hop the most range of times and no receipt confirmation is received, this node returns a route error message to the original sender of the packet, characteristic the link over that the packet couldn't be forwarded. Due to common and unpredictable topology alterations in MANETs, the package consignment rate of multicast messages can be low. Their aim is to double-check that all multicast group constituents obtain, absolutely or with a high likelihood, the facts and figures multicast in this assembly, supplied they are reachable. This paper separately measures the Battery lifetime and load generated by AODV in WMNs because of node quality victimization a simulated test bed.*
***Keywords****: APs, AODV, WMNs, Gateway, Load, Router.*

## I. Introduction

Wireless networks take several forms. VHF radio, FM–AM radio, cellular phones, and CB radios are all styles of wireless technology however have terribly specific purposes (usually for the aim of communication verbal information). When one talks regarding wireless networking, it's a couple of breed of technology that's able to communicate information. Information may be voice, the net, or the other reasonably laptop information.

This sort of wireless technology may be accustomed supplement or maybe replace existing wireless systems. IEEE 802.11 is that the normal that outlines wireless Networks standards. Another normal, called wireless scientific discipline, permits mobile devices to stay connected, even after they go in associate wireless space that incorporates a totally different IP theme than the user has. Basically, this normal permits roaming while not losing property. The wireless network is capable of being isolated from the wired network and it may not be fascinating to possess these users plug into many networks. This will minimize the chance of a virus-infected laptop computer spreading a harmful virus to many networks. For this installation, you will wish to think about a visitors' space, however solely permitting visiting user's access to the web, not to other internal network resources.

A WMN comprises of multiple mesh routers (called nodes), which can ahead packets on behalf of other mesh routers through wireless connection. To further improve the performance, a mesh router may be equipped with more than one wireless interface. Mesh routers that are attached to the Internet are called Gateways. Mesh routers usually have negligible mobility and are generally repaired, such as being deployed on roofs or streetlight poles. Like any get access to point, a mesh router can serve localized mobile stations in its area. WMNs use symmetric connections between neighbouring nodes. It does not try to pursue routes between nodes when one of the nodes cannot discover the other one. Nodes do not lie on active paths; they neither sustain any routing data nor take part in any periodic routing table exchanges.

### 1.1. AODV

The AODV protocol keeps a route table to store the next-hop routing data for destination nodes. Every routing table will be used for an amount of your time. If a route is not requested at intervals that amount, it expires and a replacement route must be found once needed. Whenever a route is employed, its time period is updated. Once a sender node includes a packet to be sent to a given destination, it's for a route in its route table.

In case there is one, it uses it to transmit the packet. Otherwise, it initiates a route discovery procedure to search out a route by broadcasting a route request (RREQ) message to its neighbours. Upon receiving a RREQ message, a node performs the subsequent actions:

- It checks for duplicate messages and discards the duplicate ones.

- It creates a reverse route to the sender node (the node from that it received the RREQ is that the next hop to the source node), associated checks whether or not it's a valid and more modern route to the destination (compared to the one at the supply node).

Just in case those two conditions hold, the node replies to the sender node with a RREP message containing the last known route to the destination (shown in figure 1). Otherwise, it retransmits the RREQ message.

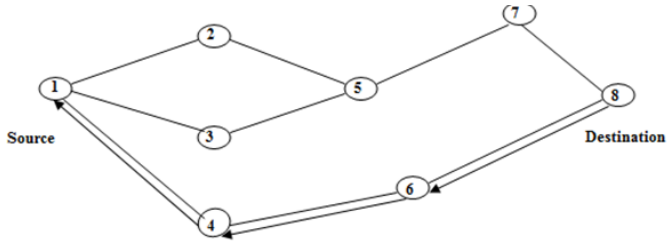


Fig.1: RREP in AODV Protocol

Route Maintenance is performed only when a node is attempting to forward a packet. If the packet cannot be successfully forwarded to the next-hop indicated in the packet's source route, Route Maintenance declares that next link in the source route to be broken, and notifies the packet's originator S with a ROUTE ERROR packet [1].

## II. Methodology Used

The performance of an ad hoc network depends on the interaction among communication entities during a given neighbourhood. Thus, in general, before a node starts human activity, it should discover the set of nodes that are at intervals its direct communication vary. Once this info is gathered, the node keeps it in an indoor organisation thus it may be utilized in completely different networking activities like routing. The behaviour of an ad hoc node depends on the behaviour of its neighbouring nodes as a result of it should sense the medium before it starts sending packets to nodes in its intrusive vary, which may cause collisions at the opposite nodes.

The forwarding algorithmic program implements a forwarding goal that will be, as an example, the shortest average hop distance from source to destination. During this case, the set of potential nodes could embody solely those in direct communication vary from the present node or additionally the set of attainable nodes in the route to the destination. The forwarding goal might also embody some QoS parameters like the number of energy on the market at every node.

## III. Experimental Test bed

Defining an experiment on any test bed involves several steps. Some of these steps, such as application and node configuration, are similar to an experiment setup in a wired testbed, while others, such as topology configuration and mobility configuration, are more specific to wireless experiment setup [2].

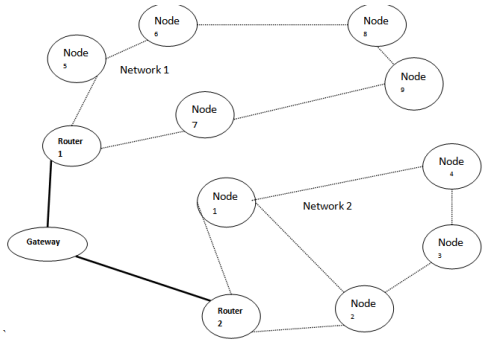


Fig. 2: Wired cum Wireless Multicast WMNs

Our implementation (see Network 2 from the fig.2) utilizes acknowledgments whenever possible, meaning that if a node 1 originating or forwarding a packet hears the next-hop node 2 forward the packet, Node 1 accepts this as evidence that the packet was successfully received by 2. If Node 1 fails to receive a passive acknowledgment for a particular packet it has transmitted to Node 2, Node 1 retransmits the packet to Node 2. When performing retransmissions at the Network layer, we also found it necessary to perform duplicate

detection so that when an acknowledgment is lost, a retransmitted packet is not needlessly forwarded through the network multiple times.

## IV. Results and Discussion

All data traffic is either from mesh nodes to Routers or through gateways or from gateway to source node. This is because the scenario used in fig.2 for exchanging messages in between the different nodes and obtaining Load and battery lifetime results from the NS2[] Simulator and discussed in following subsections.

### 4.1. Battery Lifetime

When our test-bed network operated with the layer 3 acknowledgments and retransmission scheme, the average WMNs topologies are also expected to change frequently, as node mobility will move nodes in and out of other nodes' transmission ranges and under these circumstances we calculate the battery lifetime. Battery lifetime over a Mesh Nodes was measured as 19 % (Minimum) and maximum lifetime remains 100 % and fall in below 80%.This is due to fading, losses and wireless Propagation. The variability in propagation creates a significant level of inherent packet loss with which higher layers must be prepared to cope [1].

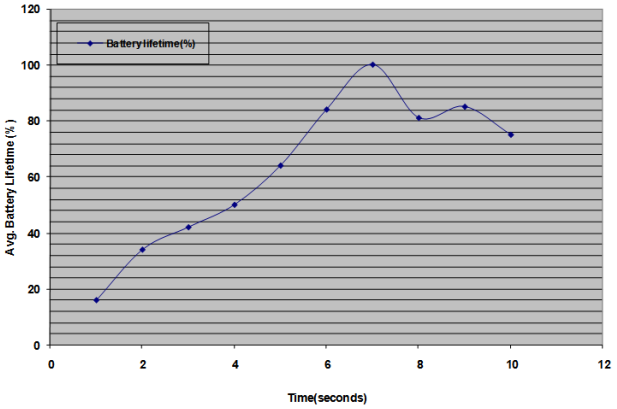


Fig.3: Battery Lifetime

### 4.2. Load

The experimental network under test used a fixed number of nodes. The experiment applied in mesh topologies for 0.1 seconds to 150 seconds. Since the load captures at every node that participates in the network and find that load of network is minimum against the previous work and shown in the figure.

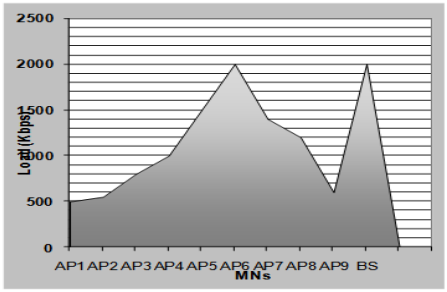


Fig.4: Load in between Mesh Nodes

## V. Conclusion and Future Work

In this paper a test-bed for evaluating an 802.11 wireless mesh network. In preliminary analysis of information from runs of the test-bed, we've measured the Battery life introduced by the mesh nodes and located that even beneath a full load and with none special quality of service handling, the network will support an information or packet delivery with acknowledgment system. For WMNs, Battery life and load are major issues. AODV protocol conjointly provides reliable state synchronization in presence of load among the nodes in mesh networks. This approach is capable of configuring a minimum of various nodes with even distribution.

In the future, we might conjointly wish to enhance our security measure, to stop a malicious node from holding or exhausting the address area. Further, for wireless network with location-dependent contention, the Cross-layer support at the network and MAC layer ought to be adopted.

## References


[1] David A. Maltz and Josh Broch ,"Lessons from a Full-Scale Multihop Wireless Ad Hoc Network Testbed",IEEE Personal Communications,2001,pp.8-15.

[2] Pradipta De, Ashish Raniwala, Srikant Sharma, and Tzi-cker Chiueh, "Design Considerations for a Multihop Wireless Network Testbed",IEEE Communications Magazine,2005,pp. 102-109.

[3] C.E. Perkins, E.M. Royer, "Ad-hoc on-demand distance vector routing", in: Proceedings of IEEE WMCSA'99, February 1999.

[4] Glenn Carl,Siamak Dastangoo,Jeffrey W. Wildman II,"USING AN EMULATION TESTBED TO MEASURE OSPF ROUTING OVERHEAD DUE TO MOBILITY IN WIRELESS AD HOC NETWORKS",IEEE,2008,pp.1-9.

[5] S. M. S. Bari, F. Anwar, M. H. Masud, "Performance Study of Hybrid Wireless Mesh Protocol (HWMP) for IEEE 802.11s WLAN Mesh Networks",International Conference on Computer and Communication Engineering (ICCCE 2012), 3-5 July 2012.

[6] Amitangshu Pal, Asis Nasipuri,"A quality based routing protocol for wireless mesh networks",Pervasive and Mobile Computing,2011.

[7] The network simulator — ns-2, http://www.isi.edu/nsnam/ns/.

[8] Timo Vanhatupa, Marko Hännikäinen, Timo D. Hamalainen, "Performance model for IEEE 802.11s wireless mesh network deployment design",J. Parallel Distrib. Comput., 2008.

[9] Yannick Lacharite, Maoyu Wang, Louise Lamont, Lars Landmark, "A Simplified Approach to Multicast Forwarding Gateways in MANET",IEEE, 2007.

[10] Charles E. Perkings, Elizabeth M.Royer and Samir R.Das,Performance Comparison of Two On-Demand Routing Protocols for Ad Hoc Networks, IEEE Personal Communications, Feb 2001.

[11] Yun Hou and Kin K. Leung,"A Distributed Scheduling Framework for Multi-User Diversity Gain and Quality of Service in Wireless Mesh Networks",IEEE Transactions On Wireless Communications, Vol. 8, No. 12, December 2009,Pp.5904-15.

[12] Qunfeng Dong,Yigal Bejerano,"Building Robust Nomadic Wireless Mesh Networks Using Directional Antennas",IEEE INFOCOM, 2008,pp.2297-2305.

[13] Tehuang Liu,Wanjiun Liao,"Location-Dependent Throughput and Delay in Wireless Mesh Networks",IEEE Transactions on Vehicular Technology, VOL. 57, NO. 2, MARCH 2008.

[14] Konstanty Bialkowski and Marius Portmann, "Design of testbed for Wireless Mesh Networks",IEEE,2010.

[15] SuKyoung Lee,Kotikalapudi Sriram,Kyungsoo Kim,Yoon Hyuk Kim, and Nada Golmie, "Vertical Handoff Decision Algorithms for Providing Optimized Performance in Heterogeneous Wireless Networks",IEEE transactions on vehicular technology, vol. 58, no. 2, february 2009,pp.865-881.