ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

Utilization of the Channels for Multicasting Wireless Multimedia in Wireless Mesh Networks

Shruti Shinde, Prof. Meeta Bakuli

M.E Student, Dept. of Electronics and Telecommunication, G.H. Raisoni College of Engineering and Management, Pune, India

Asst. Professor, Dept. of Electronics and Telecommunication, G.H. Raisoni College of Engineering and Management, Pune, India

ABSTRACT: In the wireless mesh networks (WMN) the devices operates on various channels and automatically adjust their transmission rates for those occupied channels. This paper attempts how to enhance the execution ensured performance oriented multicasting transmission coverage for wireless mesh networks (WMN) remote by investigating the transmission offered by multiple rates (MR) and multiple channels (MC). We propose the MRMC multicast algorithm (CL-MRMC) to make productive utilization of channel and transmission rates to significantly broaden wireless multicasting coverage with higher throughput and minimum delay performance for reliable interference-controlled connections. Simulation is performed using Network Simulator Software (NS2).

KEYWORDS: Wireless multicast, multi-rate, multi-channel, wireless mesh networks**.**

I. INTRODUCTION

In recent years, Multicast in a wireless mesh network (WMN) plays a major role by efficiently using wireless resources in providing flexible and dependable wireless connections to a receiver groups and is also used to supply suitable wireless connections to a group of multimedia receivers like video conferencing. This paper attempts to enhance transmission coverage with high throughput for multicast in a substantial scale WMN. Convoluted wireless multicasting interference is a noteworthy deterrent to achieve. Interference is caused by successive transmissions on the same multiple hops WMN paths, and transmission of multicast information in parallel on paths that have least one interfering hop. We can see this case in Fig. 1 to show the impact of this complicated interference.

In Fig. 1, on the path n0 n1 n2, the streaming of multimedia information is transmitted, i.e., n0 transmits the multicasting traffic to n1, n1 transmits the same information to n2. Due to wireless broadcasting, the transmission of multimedia information from n1 n2 rivals that of n0 to n1 so as to occupy the same channel. This rivalry degrades the performance from n0 to n1 as well as from n1 to n2; Because of this it corrupts the multicast execution of n0 to n1 and also of n1 to n2; In case of the parallel transmission of multicast data, paths should have no less than one interfering hop. In Fig. 1, assume n1 and n3 are such that their transmission ranges interfere each other. When multicasting transmissions are on the path from n0 to n1 to n2, multicasting transmissions from n3 to n4 occur in parallel. Due to this interference is caused which further corrupts the execution of multimedia traffic from n1 to n3. This will be very intensive while multicasting multimedia information as a result of the greater transmission rates and the longer communication durations. Execution is degraded rapidly amid multicasting wireless transmissions.

Here the complicated interference is to utilize multiple orthogonal i.e., non-overlapping channels at the interfering nodes. By joining these channels to various radio interfaces, the non-interfering capacity of a WMN can be expanded. Nonetheless, wireless technology, a predetermined number of orthogonal channels that are not adequate for multicast as

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

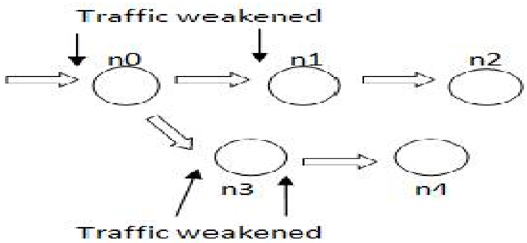
International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

interference is caused by the greater connectivity and is substantial. Henceforth, it is difficult to achieve the enhancement in extending performance-guaranteed coverage for multicasting by just proficiently utilizing those orthogonal channels. Apart from various channels, wireless devices (i.e., gate ways, routers, client nodes, etc) are used to adjust their transmission rates whenever necessary.



Fig, 1, Traffic weakening stages due to interference

The varied rates of transmission that are employed in a wireless multicasting multimedia can effectively cause a complex interference topology. There are various studies carried out to investigate the benefits of combination of multiple rates and multiple channels, concentrating mainly on enhancing communication performance like delays [1], transmission rates [2], etc. Based on the obstacles that are present in wireless transmissions, we are going to use the following schemes.

The parallel low-rate transmission (PLT) scheme enhances performance-oriented coverage for wireless in basically employing a mesh node with various channels that are being transmitted at a rate which is lower the maximum rate that is available in parallel that is total throughput which is higher than the maximum rate which is available which may be gained over more greater distances. Here we concern PLT in a multicast WMN as well as develop the significant details of implementation of PLT keeping in mind the end goal to efficiently incorporate with that of hardware like radio interfaces and protocols for eg., TCP/UDP.

The alternative rate transmission (ART) scheme efficiently utilizes rates of transmission and the channels to accomplish maximum greater-performance communication coverage for wireless by utilizing PLT scheme at the j([u/d]+1)th hops and normal transmissions with benchmark transmission rate at other hops, where d is the transmission range radius of the benchmark rate and u is the interference range radius of the rate of PLT, and by collecting suitable PLT and benchmark rates to give the good balance amongst coverage under conditions of its performance and restricted channel multiplicity. The controlled link multi-rate multi-channel multicast algorithm (CL-MRMC) is enhanced by concentrating on a wireless mesh network containing number of multicasting groups. Wireless multicasting coverage with short delays and high throughput can be ensured.

II. RELATED WORK

Here O. Karimi et al. [3] researched higher throughput multicasting Wireless Mesh Network by investigating the benefits of multiplicity of the channels and various mesh gateways. H. Chiu et al. [4] researched a program for linear integer and a related heuristic algorithm for multicasting Wireless mesh network to effectively derogate the traffic carried on channel that is vigorously crowded and increase the capacity of the vigorously crowded node by making use of various channels. A. Kakhbod et al. [5] studied the decentralized rate/bandwidth allocation issue in multiple rate multicast benefit providing vital users. K. Lee et al. [6] studied rate controlled parallel transmissions to allocate resources proficiently and enhancing the QoS of the multimedia connections. It is accomplished by breaking down the radio resources which are available into various sets of links and various levels of reliability. Distinctive levels of a multimedia stream containing various levels of significance are transmitted to remote wireless channel supporting various links with great quality. J. Qadir et al. [1] composed degree-free (DF) transmissions i.e., multiple gateways routing scheme for multi-rate multicast produced to increase the aggregate accomplished.

In any case, it may not suit multimedia communications which is of high-rate multimedia due to various transmissions of DF similar greater traffic rate effectively have backup nodes. Hence we are spurred so as to build a new scheme of

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

MRMC that will proficiently use resources of communication to accomplish the objective of augmenting coverage that will be performance-guaranteed.

III. PROPOSED ALGORITHM

Here to address the entangled obstruction utilize various orthogonal i.e. non-overlapping channels at interfering nodes. Appending such channels for various radio interfaces, the non-interfering limit can be maximized. The non-overlapping channels used are in parallel form at each nodes to accomplish an awesome aggregated capacity also in series form for progressive nodes to effectively abstain from interfering of the transmissions. There is a minimum number of non-overlapping channels which are not adequate for multihop multicast WMN due to the fact that the interference which is caused by the high connectivity is substantial. Subsequently, that is hard to increase the subsequent improvement for ensuring performance-oriented coverage by just proficiently utilizing non-overlapping channels. Client nodes likewise conform rates of transmission whenever it is needed. The accessibility of multiple transmission rates, performance can be enhanced either by bypassing around interfering nodes or backup or referring network conditions to decide suitable rate of transmission. Nonetheless, the work of multiple transmission rates may effortlessly bring extremely complicated interference topology wireless WMN multicast.

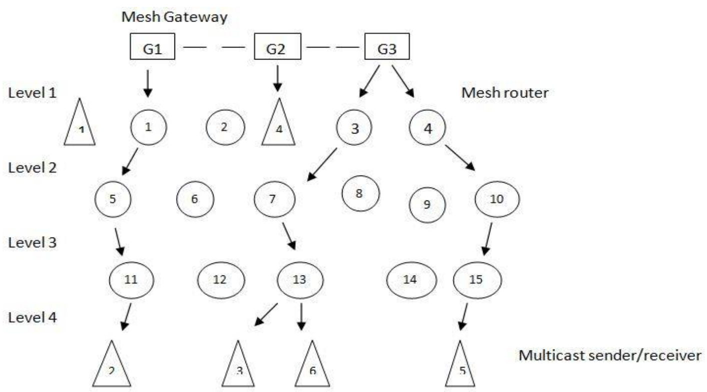


Fig.2, CL-MRMC multicast

Here in ART multicasting scheme, every group required to run multicast individually and a node which is a router forwarding WMN might play a different role like PLT or normal of various groups, bringing about complex multicast increased interference and communication. Thus, new improvements are needed to avail multiple groups MRMC multicast. Our goal is creating multicast in the foundation of WMN framework which also is accompanied by various groups which are multicasting. Particularly, our CL-MRMC

algorithm is used to construct a multicast tree established at various mesh gateways (MGs), permitting multicasting senders to load the data into the multicast tree by means of the nearest MGs and the ongoing real-time multicast communications.

Here we accept the presence of a group manager (GM) for this multicasting framework. This GM keeps up the information about senders/receivers group and framework topology. The receivers and senders of multicasting communicate with the GM to fetch data about the group ID, PLT rate and benchmark rate and it might be fundamental for various GMs to coexist for reliable multicast. So to outline algorithm as in above figure, we utilize triangular nodes for representing the multicasting senders and the receivers where multicasting senders are indicated by nodes 1 and 5.

Suppose G1 and G3 are uploading gateways for node 1 and node 5, let coordinator CL-MRMC be node 1 and node 5 exemplifies the MGs which send REGISTRATIONs of receivers into a packet GATEWAY and unicasting the packet to the coordinator by means of Internet links as well as G3. After that coordinator sorts out all the MGs in the decreasing order of number of receivers present such as G3, G1, and G2. The three MGs get to be roots of CL-MRMC

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

as each of them is needed for no less than a receiver for receiving packets of REGISTRATION and later on the hop distance of ART, the coordinator arranges every node that is required for transmitting REGISTRATIONs in various layers.

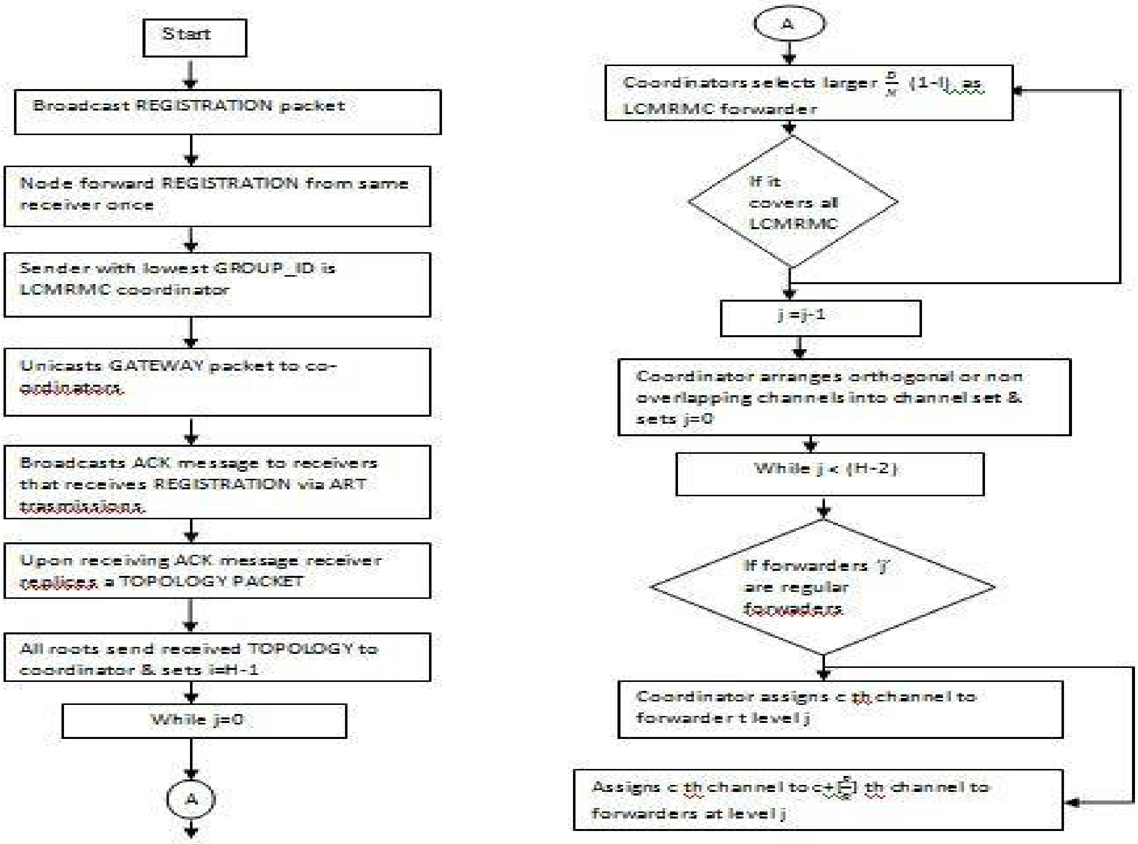


Fig.3, Flow Chart

Now beginning from level 3 which is the second largest level, the forwarders for CL-MRMC are chosen by coordinator which dependably covers the largest number of revealed receivers group at level 4. Assume 11and 15 are the mesh routers that have the similar rate of loss and 12 and 13 mesh routers connect to the two similar receivers, such as, D12 =D13 = 2, to choose a forwarder between them and then the values of N12 and N13 are compared like N12 = 4 and N13 = 3. Fundamentally, mesh router 12 is neighboring mesh router 11 which is only node which gives a connection for the receiving node 2. Henceforth, 13 mesh router will get the second forwarder at the level 3 after mesh router 11. Then the mesh router 15 which when connected with the remaining receiver node 5 will get the forwarder at level 3.

Henceforth, the coordinator chooses forwarders at levels 2 and 1 by pretty much as it does to choose level-3 forwarders. In the figure 2, the developed CL-MRMC tree, the arrow lines exhibit that multicasting senders upload the information to their uploading gateways that disperse the information to other roots by means of Internet links and in addition to receivers through the CLMRMC tree.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

IV. RESULTS

We have used the discrete event network simulator NS2.35 to perform an extensive simulation-based evaluation for ART and CL-MRMC. Table I gives the simulation parameters. We have calculated the average throughput, Packet Delivery Rate (PDR) and an average end-to-end-delay for 12,18,36,48 and 54mbps bandwidth channels shown in Table II.

Table 1 Parameters for simulation

Parameters	Value
Data Rate	12, 18, 36, 48, 54 mbps
Number of Nodes	5
Simulation Time	100 seconds
Fading Model	Nakagami
MAC	802.11g
Routing Protocol	AODV

Here by considering 12,18,36,48 and 54mbps bandwidth channels, we demonstratedhow well a network transmission scheme can deliver high quality multimedia flows to users.

Table 2 Analysis for 12, 18,36,48,54 mbps bandwidth channels

Rate	Throughput	PDR	End to end delay
12mbps	8741.645221kbps	11.238492	3.464966sec
18mbps	9286.554458kbps	14.53024	4.037210sec
36mbps	10303.619195kbps	20.917886	4.940390sec
48mbps	10737.407449kbps	23.670187	5.289034sec
54mbps	10896.464387kbps	24.672574	5.417975sec

For the QoS assessment framework for video traffic we have used EvalVid and NS2. Three connecting simulation agents, namely MyTrafficTrace, MyUDP, and MyUDPSink**,** areimplemented between NS2 and EvalVid. These are designed to read the video trace file or to generate the data required to estimate the quality of the video delivered. Here we have encoded a yuv sequence named foreman_qcif.yuv into MPEG4 data format which has 400 frames and achieved psnr graph as shown below.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Website: www.ijircce.com

Vol. 5, Issue 5, May 2017

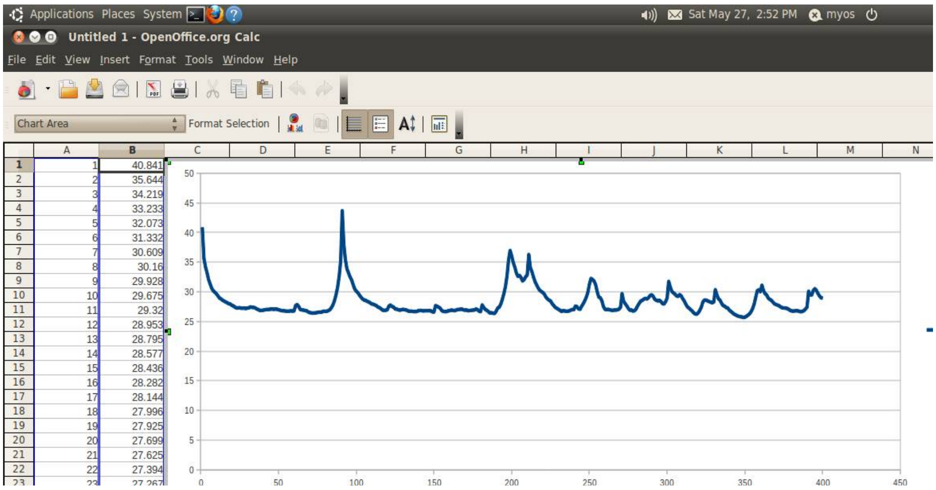


Fig.4, PSNR graph of the given video model

As the PSNR measures the error between a reconstructed image and the original one. Prior to transmission, we have computed a reference PSNR value sequence on the reconstruction of the encoded video as compared to the original raw video. After the transmission, the PSNR is computed at the receiver for the reconstructed video of the possibly corrupted video sequence received. The individual PSNR values at the source or receiver do not mean much, but the difference between the quality of the encoded video at the source and the received one can be used as an objective QoS metric to assess the transmission impact on video quality at the application level

V. CONCLUSION

The results showed the analysis of 12,18,36,48 and 54 mbps in terms of throughput, PDR and end-to-end-delay. Further modification of AOMDV multicast routing protocol in NS2 by using 802.11g protocol along with nakagami fading channel for different simulation strategies based on number of sources, number of nodes and number of groups in multicast networks and also the analysis based on packet delivery ratio, throughput, end to end delay. Furthermore the results of our NS2 simulations will prove that CL-MRMC algorithm distributes video content to the multiple groups with high performance than existing schemes in mesh networks.

REFERENCES

[1] J. Qadir, C. Chou, A. Misra, and J. Lim. Minimum Latency Broadcasting in Multiradio, Multichannel, Multirate Wireless Meshes. IEEE Transactions on Mobile Computing, vol.8, no.11, 2009.

[2] L. Farzinvash, and M. Dehghan. Multi-rate Multicast Routing in Multigateway Multi-channel Multi-radio Wireless Mesh Networks. (ELSEVIER) Journal of Network and Computer Applications, vol.40, pages 46-60, April 2014.

[3] O. Karimi, J. Liu, and Z. Li. Multicast in Multi-channel Wireless Mesh Networks. In Proc. of IFIP Networking, pages 148-159, India, 2010.

[4] S. Hon, K. Yeung, and K. Lui. Bandwidth-guaranteed Multicast in Multichannel Multi-interface Wireless Mesh Networks. In Proc. of IEEE ICC, pages 1-5, Germany, 2009.

[5] A. Kakhbod, and D. Teneketzis. An Efficient Game Form for Multi-Rate Multicast Service Provisioning. IEEE Journals on Selected Areas in Communications, vol.30, issue 11, pages 2093-2104, 2012.

[6] K. Lee, and V. Leung. Utility-Based Rate-Controlled Parallel Wireless Transmission of Multimedia Streams with Multiple Importance Levels. IEEE Transactions on Mobile Computing, vol.8, no.1, January 2009.

BIOGRAPHY

Shruti Shinde is an M.E Student in the G. H. Raisoni College of Engineering and Management, Pune.
Meeta Bakuli is an Assistant Professor in the G. H. Raisoni College of Engineering and Management, Pune.

 DOI: 10.15680/IJIRCCE.2017. 0505160