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Analysis of IPTV services in LAN/WLAN networks

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Abstract— The Internet Protocol Television (IPTV) is becoming one of the most promising applications over next generation networks. With the recent released of IEEE 802.16d/e, it is capable ensuring high bandwidths and low latency and suitable for delivering multimedia services. Importance of perceptual quality has arisen as one of the major issues to successfully deploy IPTV services. Therefore, guaranteeing a certain level of network QoS is well and widely understood, but it is much more important to notice perceptual quality as perceived by the user. In this paper, we have designed a new network consists of FTP server and HTTP server which are connected to four subnets and IP cloud. We have evaluated the performance of this network and quality of service considering the parameters throughput, delay, load and data dropped.

Keywords—IPTV, Opnet, Quality of Service, Wireless

I. INTRODUCTION

Internet Protocol Television (IPTV) [1] is a system of distributing digital television content by using IP over a network infrastructure, where end user receives video streams through set-top box which is connected to a broadband connection. In general, IPTV means delivering television content to the receiver by using Internet technology, instead of using traditional format like broadcast or cable. The IPTV and Internet TV are not similar. Internet TV is a service like YouTube where a user can watch content by streaming or downloading. But IPTV is a part of "Triple Play" service which consists of IPTV, VOIP and Internet access. From the last few years, the market for IPTV service has grown rapidly and the trend is being continued [2].

IPTV is a multicast service which permits only the channel actually being viewed by the end user. So, it is more bandwidth efficient than conventional analog or digital TV services. Now telecommunications service providers view IPTV as technology that enables them to use their IP based network infrastructures to offer multi-channel television services. But launching a new service always involves a number of technical and non-technical risks. To make this service successful according to user expectation reliable multicast is essential. Even though there are different types of multicast mechanism has been proposed for this new technology. But which multicast mechanism will full fill the user expectations and beneficial for service provider is still burning issue [2].

Rest of the paper is organized as follows, Section I contains the introduction of IPTV, Section II contain the related work of the IPTV. Section III contains methodology and description of designed network. Section IV contain the setting of simulation environment. Section V explain the results and analysis of the outcome of the model. Section V concludes research work with future directions).

II. RELATED WORK

Currently, the evaluation methods for the speech service are mature. For subjective evaluation methods, opinion rating

(MaS) based on customer's satisfaction has been studied to assess the perceptual QoS. It is specified in ITU-T recommendations E.800 initially [3]. On another hand, several objective quality assessed methods has been proposed in ITU-T, such as P.861 [4] PSQM (Perceptual Speech Quality Measure), P.862 [11] PESQ (Perceptual Evaluation of Speech Quality) and G.I07 E-Model [5].

For the video service evaluation, subjective video quality evaluation method is the most reliable video quality measurement method. A group of viewers is selected and gathered in a room, the measurement environment is specified in the ITU-T Recommendation P.910 [6]. For the research of objective video quality method, some estimation software has been developed which can analyse the video signals and produce the quality evaluation results. One traditional objective video quality measurement, Peak Signal to Noise Ratio (PSNR), has been widely used in many applications to assess video quality.

PSNR does not take the visual masking phenomenon into consideration. In other words, every single pixel error contributes to the decrease of the PSNR, even if this error is

not perceived. SO, MPQM (Moving Pictures Quality Metric) was proposed for the objective the video quality measurement [7] [8]. MPQM is an objective quality metric for moving picture which incorporates human vision characteristics. MPQM represents the typical image quality assessment models based on the error sensitivity. The widely adopted assumption of these models is that the loss of perceptual quality is directly related to the visibility of the error signal.

From current research status of evaluation method, we can see that the subjective method based on user survey can reflect the experience of user more directly and match well to the feeling of user. However, this kind of method has several problems, such as, it required special environment and equipments, needs a mass of people to participate the test. In conclusion, subjective video quality measurement cannot provide real-time and in-service quality monitoring or real time video applications. So the application of the method is limited [9].

III. METHODOLOGY

To evaluate the performance for IPTV service, we need to combine the both LAN and WLAN in a single network and then we have to calculate its performance in both LAN and WLAN and also we have to compare them. The Network in Fig. 1, we designed consists of the IP Cloud, one HTTP server and one FTP server, four subnets which are Meeting Office, Commercial Office, Boss Room and Engineering Office. All four offices are connected to Switch and to router through Firewall. Both the server is connected to IP Cloud and is protected by another firewall. There is another server in the Engineering office as a Backup server in case of failure of any of server. The parameters settings for configuration of various applications of are configured and shown in fig. 2.

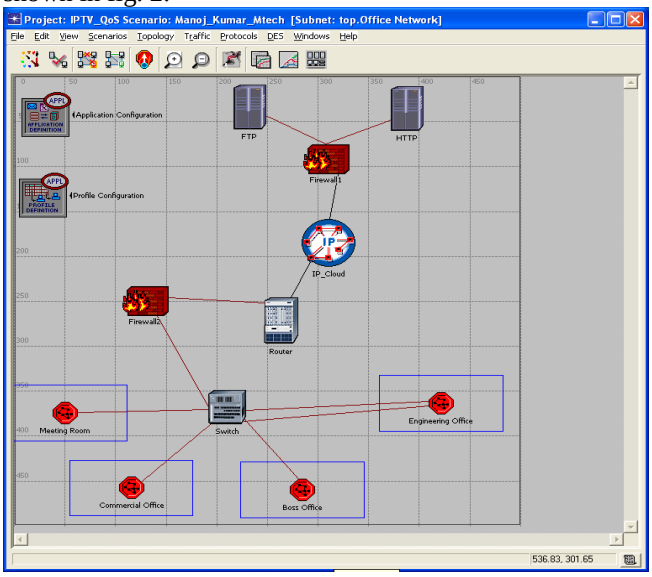

Fig. 1. Architecture of Designed Network

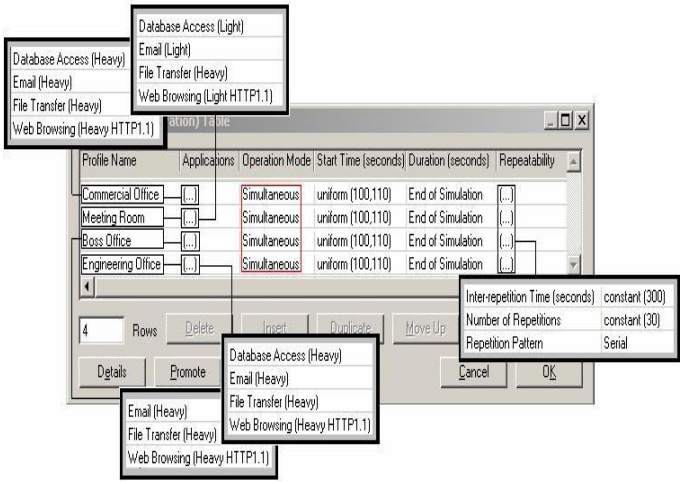

Fig.2. Parameters settings

Table 1. Simulation Settings

Attribute	Value
Inter-repetition Time	Constant(300)
Number of Repetitions	Constant(300)
Repetition Pattern	Serial

IV. SIMULATION OF NETWORK

4.1 Simulation Analysis Parameters

Table 2. Parameter Setting for Wireless LAN

S.NO.	Parameter	Value
1	MAC Address	Auto assigned
2	Access Point Functionality	Disabled
3	Physical Characteristics	DSSS
4	Data rate	11Mbps
5	Transmit Power	.0005W
6	Short Retry Limit	7
7	Buffer Size	256000
8	Large Packet Processing	Drop

4.2 Simulation

We can collect statistics from individual nodes in my network (Node Statistics) or from the entire network as a whole (Global Statistics). Furthermore, the statistics of the links can be collected (Link Statistics). The statistics that can be collected for each of the above categories (Global Statistics, Node Statistics and Link Statistics) are of following nodes.

Global Statistics: 1) Email, 2) Ethernet, 3) Ftp, 4) HTTP, 5) IP, 6) Wireless LAN.

Node Statistics: 1) Client Email, 2) Client Ftp, 3) Client Http, 4) LAN, 5) Server Email, 6) Server Ftp, 7) Server Jobs, 8) Server Performance, 9) Wireless Lan.

Link Statistics: 1) Point-to-Point

The following parameters must be set in order to configure the simulation.

- **Duration:** 300 seconds
- **Seed:** 128
- **Values per statistic:**100

We configure the settings of various parameters of WLAN of IPTV set up are configured in table 1 and table 2 and in fig. 3.

The simulations are carried out for 300 seconds and the fig. 4 shows the results of final results. The individual results are discussed in next section.

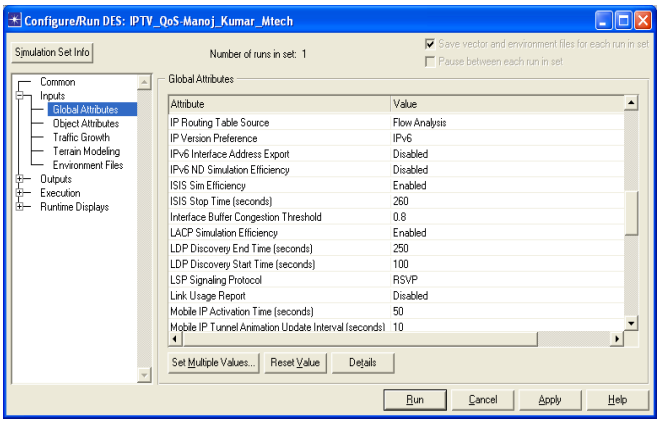

Fig. 3. Simulation Configuration Settings

V. RESULTS AND DISCUSSION

5.1 Load Vs Throughput

The graph in fig. 5 describes the relation between load and throughput of the Wireless LAN. Load represents the total load (in bits/sec) submitted to wireless LAN layers by all other higher layers in all WLAN nodes of the network. Furthermore, throughput represents the total number of bits (in bits/sec) forwarded from wireless LAN layers to higher layers in all WLAN nodes of the network. Therefore, the throughput of the whole network (Global Statistics) is expected equal to the load of the whole network.

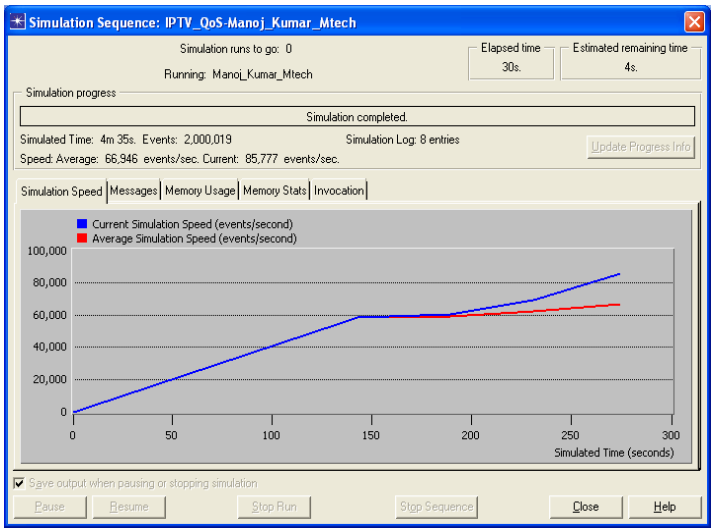

Fig.4. Simulations Running

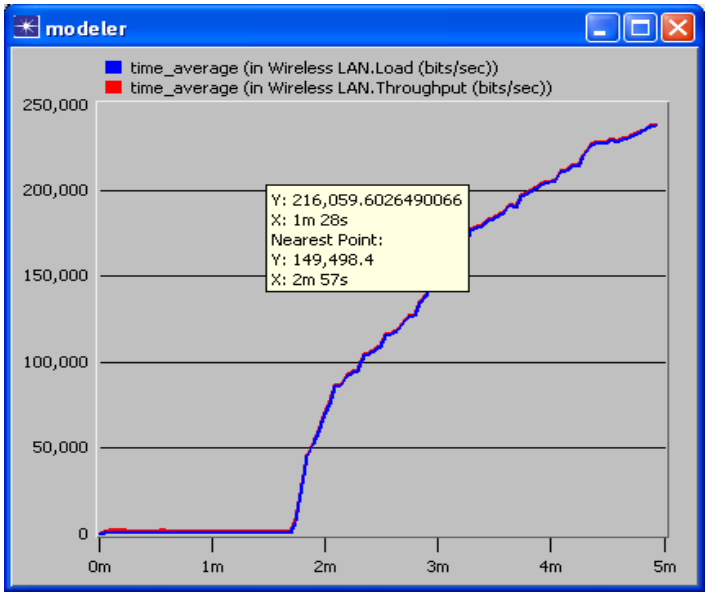

Fig. 5. Load vs Throughput

From the above fig. 5 , it is obvious that the **load** is equal the **throughput**. This result-outcome was expected. The load is equal to the throughput due to the small **delay** and some **possible retransmissions.**

5.2 Wireless LAN Data dropped in the network

Wireless LAN data dropped statistics describes the total size of higher layer data packets(in bits/sec) dropped by all the WLAN MACs in the network due to the overflow of higher layer buffer in Wireless LAN data dropped for every value is equal to zero (0) from graph plotted in fig. 6.

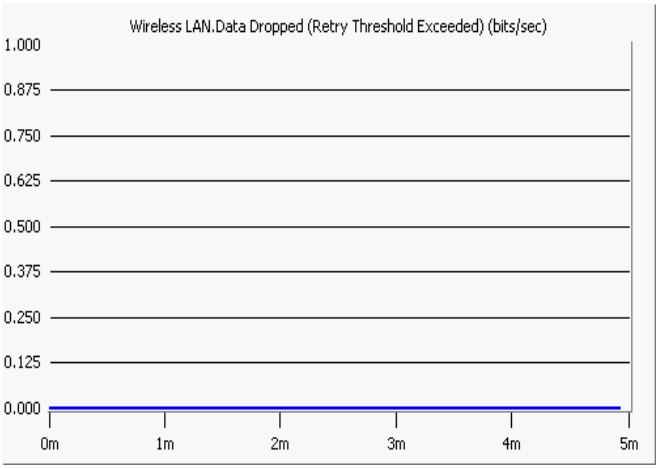

Fig.6. Data Dropped in WLAN

VI. CONCLUSION AND FUTURE SCOPE

In this paper, we have evaluated performance of IPTV in Wireless LAN. The propose model can be implemented in various huge and large offices where data dropped is very large. Through our proposed model, network providers can predict subscriber's Quality of Service in provided network environment and analogize service environment which meet the optimum QoS on the contrary. On a real time basis, it is more rapidly able to correspond to the poor quality by monitoring the QoS of the IPTV service. The service provider can provide the multimedia service of the improved QoS through the proposed QoS control processes. And moreover, the network operator can prevent the unnecessary investment for the enlargement, maintenance and repair of the network. The wide question survey should be performed against service subscribers in the future in order to reduce a gap of the user's satisfaction with the measured QoS class actually.

VII. REFERENCES

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Authors Profile

Prof. Ritu Sindhu is a B.Tech(CSE) from Ajay Kumar Garg Engineering College affiliated to UPTU Lucknow,UP in 2004 and M.Tech and Ph.D (CSE) from Banasthali University, Rajasthan in 2006 and 2012 respectively. I was an honours student throughout my Academic Career. Although my research career has just begun from year 2008, She have accumulated a strong background in several research fields and have developed a strong research foundation that will help to ensure my future success as a Researcher/Academician. Over the last 5 years, she have gained research experience in three main areas like Agent Technology, Data Mining and Computer Networks. She have guided more than 30 M.Tech +B.Tech students for their Thesis/Dissertation work. She have published more than 40 research papers in reputed National/ International Journals /Conferences. She have attended various Short Term Courses, Workshops, and Training etc and enriched my research experience from time to time. She have contributed in academics through organization of various refreshers courses/conferences/workshop/training and also through leadership at different levels at mine various reputed University/Institute worked places. To sharpen my research skills and attitude she is associated with various Technical Societies like, IACSIT, Computer Science Teacher Association (CSTA), International Association of Engineers (IAENG) etc. I am editorial member of various International/National Journals/Conferences. I have also served as Technical Program Committee (TPC) member of many International conferences worldwide.

