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SHIFTING FROM ANALOGUE TO DIGITAL TV USING IPTV PROTOCOL

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ABSTRACT: *The problem is that the analogue television broadcasting will end in the year 2015. That is, any analog TV channels will not protected after this year. Switching entirely to digital technology and take advantage of the Internet protocols in broadcasting and various compression techniques become necessary. So researcher aimed to highlight the importance of digital and inevitable techniques to take advantage of online networks, leading to provide TV services over the Internet Protocol IPTV. The objectives of the research is to apply TV Internet protocol (IPTV) with VLC program, and Opnet modeler to simulate the IPTV system and measure system efficiency. The researcher used the experimental method and simulation program to conduct this research. It was found helpful to shift from analogue to digital broadcasting because it is efficient and reliable.*

KEYWORDS: Video on Demand (VOD), Simulation, OPNET Modeler

INTRODUCTION

It is noted that TV passed over different stages since the beginning of the broadcast, via antenna, cables, and the end of the TV and Satellite Receiver from around the world via satellite. The television sets have been taken to evolve[2] from monochrome TV (black and white) to color TV, and the evolution of precision in screens to the emergence of the generation of: plasma, LCD, and HD, which support the movement of images and movies of high quality technology. Although the media professionals classified television as a cold technology because it kills imagination and thinking-unlike other hot techniques- such as press and radio, the television captured the attention of many segments of society, and become remarkable for young and old. It provides them with ready information without fatigue in searching and browsing and became everyone's wishes covers the allocation of leisure and sports and political channels, matching all segments of society. Before two decades a new generation collected all the traditional media in one place, it is the Internet (uninvited guest to those means) who was able to break into all areas because of its high ability to communicate and provide unique technological solutions in various fields, including the field of media.

The objectives of this research are to apply TV Internet Protocol technology[3] by using VLC software and OPNET modeler program to simulate the IPTV system and measure system efficiency.

Theoretical framework

The beginning of television broadcasting was in the thirties of the last century with bi-color signals limited dimensions (between 60 and 240 separate lines). The way of showing then rely on a sequential scan lines (Progressive), so that all the lines are scanned one by one.

After the end of World War II, the interlaced system has been adopted, which is based on the sending of odd lines of the image and then followed by even, which led to increase the number of lines to 625 lines horizontally at a rate of 25 frames per second. Total package size does not exceed 5MHz.

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Soon the atmosphere was overwhelmed by television stations that began to consume the allocated radio frequency for television broadcasting. This is why people search for new ways to increase the number of stations that can sent within the same display currently available package.

Types of television broadcasting

TV broadcasting is divided into two parts: analogue broadcasting or analogue terrestrial broadcasting, which operates as wireless to send television programs to the destination. The broadcasting for the ground transmission or space is via radio waves. Digital broadcasting in another hand is a method based on the terrestrial digital broadcasting in which carrying digitized signals for video, audio, and coordinated in a single flow, before being digitized and broadcasted to the receiver through the oscilloscope. This digital encoded signal can modify the image and sound, to send it to more than one station via one channel to the external antennas.

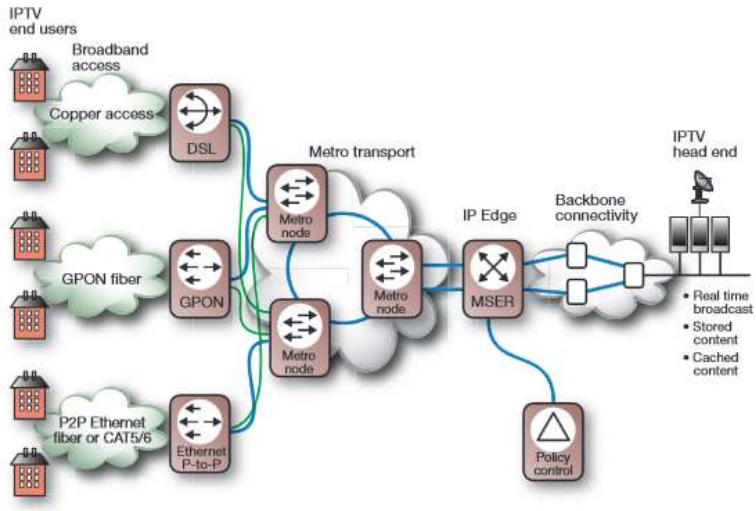

Fig. 1 Internet TV protocol Infrastructure[4]

Broadcast via the Internet

With the expansion in the field of visual media and movement toward modern and interactive version, this concept confused many users, but the basic meaning to this concept is the possibility of broadcasting and watching the television online material, whether these substances online or offline. To illustrate this concept clearly it is better to know the mechanism of transmission known as IPTV that uses the Internet Protocol (IP) across computer networks and without the need to use satellite. The fundamental difference between traditional systems and IPTV system is the use of computer networks instead of traditional broadcasting for the delivery of visual material to the viewer.

IPTV

IPTV is based on the provision of digital television broadcast service using the Internet Protocol (IP) over computer networks. Internet Protocol TV[5] (IPTV) is a system through which one can provide Internet TV services using Internet protocol over network infrastructure. It often operate using broadband[6] Internet lines system. In general, the basic difference between any IPTV system and the traditional TV systems is the use of computer networks instead of

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Conventional broadcasting channels for the delivery of visual material to the viewer. Any IPTV system is different from Internet TV system where the first used the separate private networks such as local area networks (LANs), while Internet TV works on the Internet.

On most cases, IPTV services[7] used to provide video on demand and so in line with the VoIP service (VoIP) with the ability to access the Internet and that is what is known by the term Triple Play. Television broadcasting is divided by coverage to ground and transmit the broadcast space. The cable TV is used in order to expand coverage.

Transition from analogue to digital

The transition to digital broadcasting become imperative of our time in order to provide better service to viewers and keep pace with the technical development of the twenty-first century. There was a global agreement in the regional conference for planning the radio RRC-06, which was held in Geneva in 2006 on the transition to digital broadcasting in the UHF band starting from the year 2015, and in the VHF band starting from 2020, where protection will be canceled on these frequencies after this period. The system is the adoption of the DVB-T in Europe, Africa and the Arab world.

This also provides many other benefits for the transition to the transmission stations and television production, among them increasing the number of channels, high quality reception, and coverage comparable to send the current analogue stations but lower by about 8-10 dB of possible required in analogue system. In addition to that, it can transfer additional data with reference (surround sound more than one language, translation, broadcast program, etc.), and new services like broadcasting to portable devices (using the DVB-H, for example), high-definition television (HD) and support for interactive TV, interactive games, high-speed Internet browsing, and the time of transformation and customization.

Protocols are a set of rules and procedures that are used to connect two or more devices. Its mission is to identify the rules and procedures that govern communication and interaction between the various computers on the network.

The group of the protocols that work together is called Protocol Stack. The most important Internet protocols are TCP/IP protocol, UDP, VoIP, HTTP, FTP, and TELNET protocol

IPTV Architecture

IPTV standard[5] model consists of the following functional blocks: Super head-end, Core network, Access network, DSLAMs, Regional head-end, and Customer premise.

IPTV networking techniques

IPTV technology is part of a new generation of services designed to facilitate access to video[8] entertainment. It provides access to digital television in the medium range over IP from a head-end device to the end user TV set-top box's (STB). Most service providers use dedicated transmission network to support IPTV.

The practical framework

In this section, a presentation of what has been explained in theoretical framework will be applied. A presentation of the concept of multi-transmitter and technology provided by IPTV through a simulation of the system will also be offered, using the VLC program and then test

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and measure the efficiency of the system through networks simulator program OPNET[2] Modeler.

Broadcasting by using the VLC

By running VLC program and selecting streaming from Media list, one can select the program that is to be broadcasted. In figure 2 (RTP / MPEG Transport Stream) Protocol has been selected because this protocol provides functionality suitable for data transfer via real-time, such as voice and video or simulation data across multiple networks or unicast services.

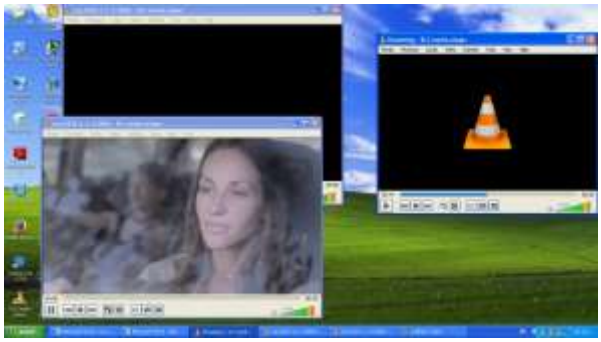

Figure 2 shows broadcast through the VLC for 2 stations.

Implementation by using Opnet program to simulate the system

Opnet is used to simulate the system as in fig (4) by following these steps: -

1. Open Opnet program to select the previous model and represent it on the program as in fig. 4.

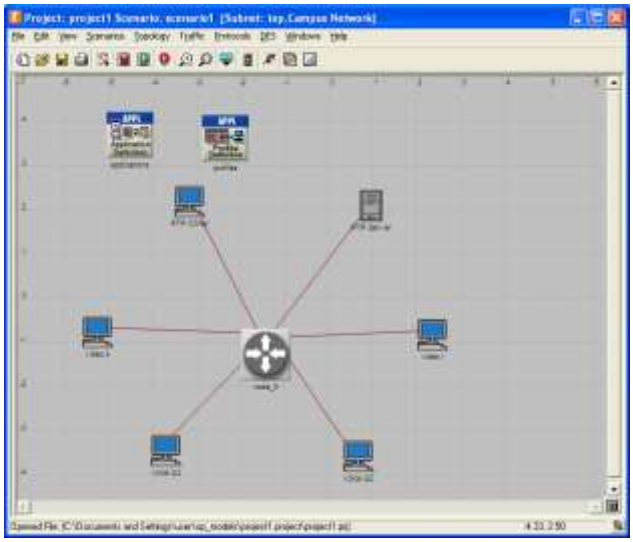

Figure 3 represents the Internet Protocol by using Opnet program

2. Configure the server profile
3. In the same way the sound, video, data, and applications are configured.
4. After the configuration, simulation run starts.

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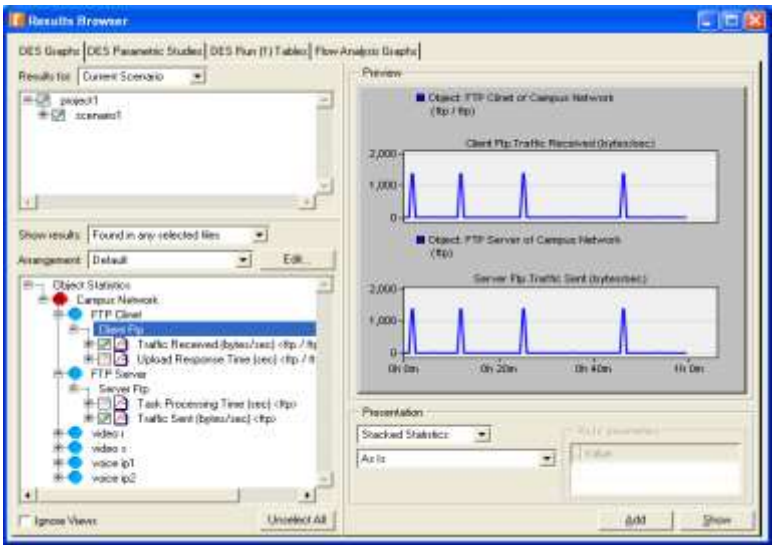

Figure 4 Results of FTP

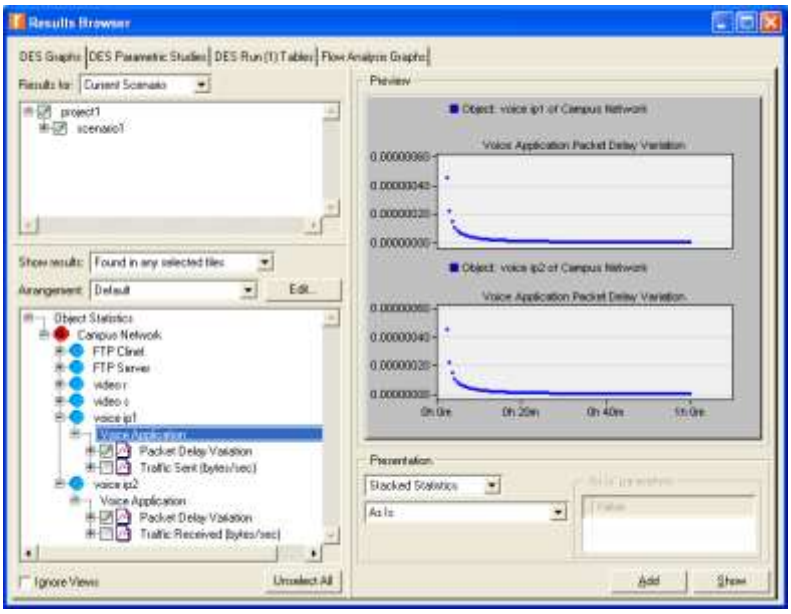

Figure 5 statements of the sound results

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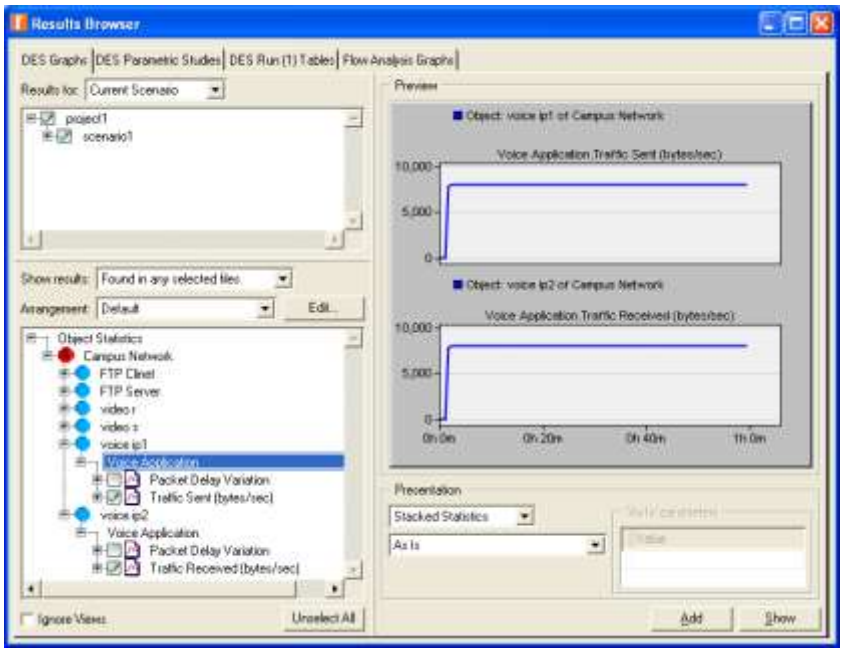

Figure 6 statements for the video results

RESULTS AND DISCUSSION

After testing the program by applying the scenario by using VLC program, it was found that VLC supports running on multiple platforms, and different operating system. Experiment showed that the possibility of implementing of the multi transmission is efficient with high quality. The second scenario for the video, explains that there is no loss or missing in video when using OPNET. The result showed in fig. 8.

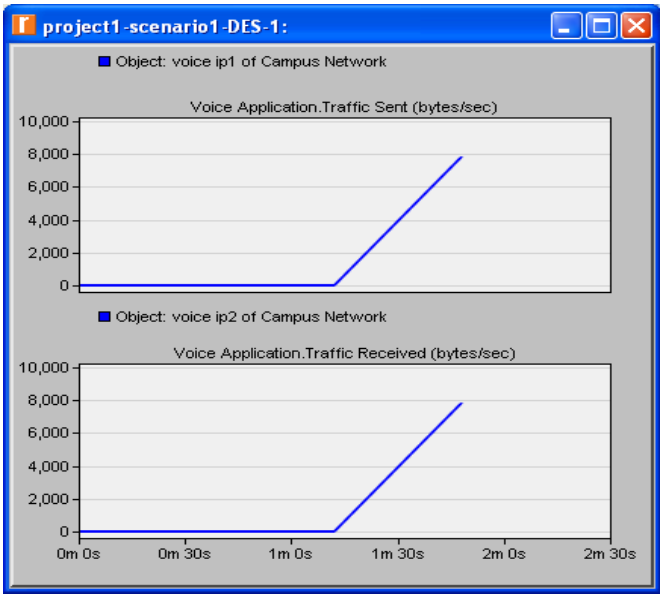

Figure 7 sending and receiving voice using OPNET

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The simulation results showed that the television broadcasting system over Internet Protocol represents an innovative new system and favorite. That is because of its features to reduce delay time in the delivery of the final material transmitted to the recipient, in addition to the guarantee of delivering the content, without delay or noise.

CONCLUSIONS

The digital broadcasting is one of the television broadcast using modern methods of communication mechanisms like computer networks and the Internet for the delivery of content to viewers as fast, cheaper and clearer image. One can conclude up with the following points:

1. The IPTV system quite keep pace with the digital system and is expected to be the prevailing in the world by the year 2020.
2. Possibility of reaching the largest number of viewers easily.
3. Completely shifting to digital and new technologies without burden.
4. Digital technology enhanced the interactive programs, and enabled the viewer to take advantage of sharing in the program by one way or another.
5. Digital technology made it possible to users to receive TV programs and movies to be stored digitally by using Internet, personal computers and digital notebooks, mobile phones and the viewer can see the material that he wants at a time when he wants and where he wants.

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