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Dynamic Data Payload & Data Packets Transmission over Network using UDPLite

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ABSTRACT

In last few years, usage of Mobile Ad-hoc Networks (MANETs) for communication has increased at a faster pace due to its easiness of application and flexibility. Also, broadcast of multimedia matters over Internet is the most extensively used technologies being used worldwide. According to the trends used in technology, most of the information directed through the Internet are interactive multimedia contents, which favors to be delivered in error-state than being rejected or arriving late. To avoid network jamming, it is favored to transfer the information without any overhead of former connection establishment. To use UDP as transport protocol is an answer to both the problems, which provide no consistency and have low rules processing overhead. UDP-Lite an improved version of UDP, was also introduced an era ago, which has been precisely designed for real-time multimedia applications. To compare the performances of UDP and UDP-Lite by altering several network parameters for transmitting various video codecs, is the aim of this paper.

INTRODUCTION

Real time multimedia and mobile video communications are the major technologies widely used in network communication and internet communication nowadays [7]. In recent years Mobile Ad-hoc Networks (MANETs) is the technology successfully and efficiently used. In Network Communication Mobile Ad-hoc Networks widely used without infrastructure because this network have technique to connect anywhere anytime at any place. This is the technology which provide wireless connectivity to users free, contribute easy and feasible access to the communication network and its services. In multimedia applications like voice and video communication on networks this technologies widely used nowadays [8].

As network technology is got better, requirement of new network application, protocols and up gradation of technology demands increasingly each day. Now a days a wide variety of new network applications are being invented daily. For Internet Connectivity High bandwidth is required for almost all the network and internet applications [5]. As we see that, YouTube and other video streaming application has accounted large traffic over the internet and there are large amount of request sent and received for video transmission and to speed up the transmission over network researcher always doing work on this technology to increase the efficiency of transmission. This rising technologies of video transmission are presently a very exciting and exigent area of research. The various video codecs H.261, MPEG-4, H.236, H.264, and H.263 etc. are used widely over the Internet [2]. A variety of network types are used to send and receive multimedia transmission over the intranet and Internet, the most preferred network MANETs is used because it is easy to install and required less wiring and physical connection. In real time transmission over internet multimedia application always require on time delivery of packet in transportation and this is always seen as a major concern. Udp and UDP-Lite is the greatest transmission protocol

for these delay sensitive application. These protocol provide connectionless and unreliable services and contain less protocol processing so these protocol is best suited for multimedia application and multimedia streaming. These protocol delivering multimedia applications more speedily and efficiently. In UDP transmission the complete data packet is check summed means the packet sent over network is checked for errors or none of it. In case of UDP-Lite an advance version of UDP which used checksum of packets partially [5]. In this way, the network is also accepted corrupted data to the destination so UDP-Lite is mostly preferred protocol to send or receive videos and audios over network for on time delivery.

In this paper, the efficiency speed and performance of UDP-lite and UDP is processed and compared on different networks with various parameters using multimedia applications. These parameter has been used to check the performance of UDP-Lite and UDP for different video codecs by modifying various network parameters like traffic, mobility, nodes and bandwidth for throughput, retransmission attempts and media access delay.

Objective

The main task of this paper is to develop a technique to speed up the video transmission with accuracy without any loss of packet and to eliminate the drawbacks of UDP protocol by using the enhanced protocol UDP-Lite, Some researcher mainly work on improve the picture quality and increase the performance of the streaming time of video, and also work on enhancing the efficiency of the overall system. But the major problem with udp-lite is that the packet size including header size is fix this would sometimes down the performance of system when network is fast and system is upgraded, here in this paper we are working on dynamic packets.

LITERATURE REVIEW

A lot of work have been done by the researchers related to the assessment and comparison of the performance of UDP and UDP-Lite, and many multimedia presentations on the basis of minute fault rate, audio and video superiority, on-time delivery, postponements, check-summing etc.

A simple, with no connection at all, transport level procedure, UDP was planned which provided least conventions mechanism, no delivery and duplicate protection to the packets once sent, for real time transmission of particular time controlled applications over the Internet like various multimedia contents, text, audial, visuals, audiovisual etc. [3].A lightweight version of UDP transport protocol in the form of partial checksum, was presented with improved flexibility. [5].

Through social networking and catch up TV, video-based web traffic remains to grow and control the Internet. In current years, YouTube has accounted for 27% of all video traffic sent and received over the Internet. The developing technologies of video compression are presently a very stimulating and inspiring time for this area of research [2].Lars-Åke Larzon et al. Compared and studied the performance of UDP and UDP-Lite for an audio coding (24 bytes of information) and a PCM audio (8 kHz sampling frequency) for numerous transmission methods i.e. UDP + CRTP, UDP, UDP-lite and UDP-lite + CRTP [4]. As compared to UDP, UDP-lite gave better results if quality is bargained to some degree. Studies were made on the effects of wireless channel on the quality of the transmitted on time Ultrasound Video by applying UDP and UDP-lite as transport level rules, and on the basis of Bit Error Rate (BER) and Peak Signal to Noise Ratio (PSNR), the efficacy of using both is assessed [2]. Amoolya Singh et al. [8] proposed Flexible check-summing patterns supporting bit-error resilient

codecs for wireless network architecture. They improved the transport layer rules by employing UDP lite and PP P-lite to the transport and link layer protocols correspondingly. Due to which, UDP-lite gave better outcomes and significantly improved video quality than UDP. A method was recommended to the use of MPEG-4 and UDP-Lite for the coming generation transport for IP multimedia. The authors decided that UDP-Lite affords much more flexibility by allowing distribution of partly corrupted packets and also could offer improved video quality particularly over an error prone situation [7].

Optimized Network Engineering Tool (OPNET) provides a broad expansion environment for the simulation, specification and performance investigation of communication networks. Xinjie Chang has compared various network simulators like; INSANE, REAL, OPNET Modeler, NetSim, VINT, NS-2, Harvard simulator and U-Net are also discussed. A network simulation setting containing numerous Ethernet subnets linked by an ATM network backbone has been displayed to match packet loss ratio and end-to-end delay [18]. Optimized Network Engineering Tool (OPNET) was listed as the most influential software simulation package.

Proposed Methodology

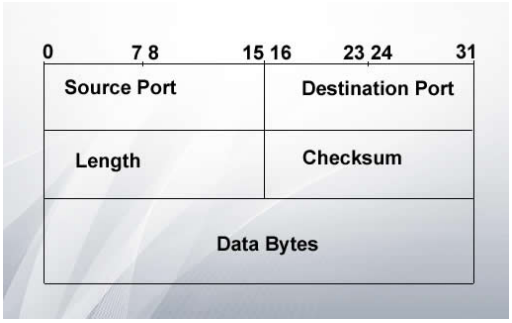
OVERVIEW OF UDP-Lite AND UDP

In this segment, a momentary discussion about the transport protocols, UDP-Lite and UDP is given. Discussion in detail have been made in the header formats of both the protocols.

UDP (User Datagram Protocol)

UDP is a extensively used transport layer protocol. No prior linking is required for information transmission. There is no guarantee of any delivery and duplicate protection of the packets sent. They may appear duplicated, arrive in-sequence or go missing without notice. UDP has protocol identifier, 17, when used in the Internet Protocol [3].

The UDP Header has four fields of 2 bytes each(total 8 bytes). It is as shown in figure



UDP Header Format

The fields in the header format of UDP are discussed below:

- Source Port: It specifies the port of the sending application procedure. It is supposed to be the port to which an answer should be given back in the lack of any other facts. It is an elective field.
- Destination or Sink Port: This is the port to get receiving process of a specific Internet destination address.
- Length: It includes the header and the information sent along with (if any). (Minimum value of the length is eight.)
- Checksum: The IP header is encapsulated with the 16 bit one's complement consist sum of one's complements pseudo header of information.

UDP-Lite

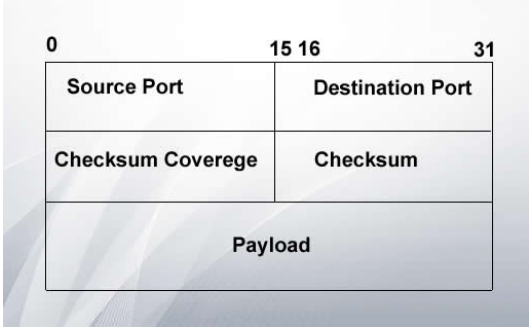
Similar to the User Datagram Protocol, UDP-lite (Lightweight User Datagram Protocol) is also simple and connectionless transport layer protocol. A checksum is included in UDP-Lite, which offers an optional limited analysis of the packet to be sent, means a packet is distinguish

into two parts, an insensitive part (not covered by the checksum) and a sensitive part (covered by the checksum). The packet cannot be discarded by the receiver if any error(s) is there in the insensitive part. UDP-Lite is semantically identical to UDP, when the checksum covers the entire packet (header + data), [6].

UDP and UDLite both are same techniques in terms of semantics and structure.

Applications which developed through UDP can be implemented on UDP-Lite because both have compatible with each other. UDP protocols are easily implemented and best suit for multimedia streaming but to improve the quality of streaming this protocol require some improvement.UDP-Lite is the modified and improved technique which work better than UDP.[4]

The header of UDP-lite format consist of eight bytes long and implemented with four fields of two bytes each. As shown in the figure



UDP-Lite Header Format

All the four fields are describe below [5] Checksum Coverage: It is the number of bytes being enclosed by the checksum. Checksum is the process which must be covered with header of UDP-Lite (8 bytes). If the Coverage of checksum is zero, it defines that the complete UDP-Lite packet (header + data) is processed by the checksum. If Checksum coverage will return 8 it means that only UDP-Lite header is processed by the checksum. The destination end must abandon the UDPLite packet when Checksum process value return between 1 and 7.

Checksum: The IP header is encapsulated with the 16 bit one's complement consist sum of one's complements pseudo header of information. It defines the number of bytes specified in the Checksum Coverage.

- Source Port: It represent the source address from where data is send.
- Destination Port:It represent the destination address where data is received this address store in IP Header.

Real Time Transport Protocol (RTP)

RTP allows you to recognize the type of data being transmitted, find out in what order the packets of data should be represented in synchronized multimedia transmission from different sources.

RTP data packets transmission not giving you a guarantee to send data in order. It's on the receiver end to detect the lost packets in the packet header and reconstruct the packet even RTP does not provide any technique to timely deliver the data.

Firstly set the size of the bits which is of audio, video, image. Store the video in memory using byte stream, now read the bytes from stream and store them into packet ,we can resize this packet according to the requirements. Then we prepare overhead with combination of IP+RTP+UDP+PPP. Then set a transport protocol i.e. UDP-Lite. UDP-lite packet consist

of data in bits and overhead. The Packet size is divided with N (Dynamic packets i.e. 16, 24,32 bits) that is known as radio blocks now all the packets and the overhead also divided into N parts . Now these part transmitted over network. If any bit loss during transmission then the checksum coverage generate some values that indicate whether there is problem or data loss in header or data loss in packet. After find out the problem in packet we will take action according to the problem if there is problem in header the we will prepared header again and retransmit over network again and if there is problem in data packet then we will read data from input stream and retransmitted over network. If there is not any data loss then we will get output from video stream.

Protocols Used

We will work on following protocols for transmission purpose:

User Datagram Protocol (UDP).

Point-to-Point Protocol (PPP).

Real Time Transport Protocol (RTP).

Internet Protocol (IP).

Conclusion

In current era, video streaming on multimedia application is the most widely used technology for the network communication. Now we explain the transport communication protocol that is generally used in UDP. Its main properties to divide the data packet into two parts first part contains more complex errors and second one contains less complex errors. Errors are tolerable by data payload to decrease the number of gratuitously discarded packets. In this paper we discovered the technique for enhancing video streaming on multimedia data transmission. On applying this technique data will not be lost and if it is lost then it is recovered and again retransmit over network. So it has been discover that the complete performance Dynamic UDP-Lite packets is much more better than UDP in terms of data retransmission, throughput, physical data rate, active users and transmission speed.

Future Work

In recent years, multimedia are the most widely used technologies for communication, by the users. We have described the new transport protocol that is a flexible version of the commonly used UDP. Its main feature is to divide the packet into two parts; one that is more sensitive to errors and one that is less sensitive. Using this mechanism, the sending application can specify that errors are acceptable in part of the data payload in order to reduce the number of unnecessarily discarded packets. We further explored the techniques for improving multimedia content delivery. Through experiments, transferring live video, we showed how the flexible check summing in UDPLite yields markedly higher throughput, streaming time while keeping the jitter and video quality constant.

References

[1] Carolina Hernández, Álvaro Alesanco, Violeta Abadia, José Gracía, “The Effects of Wireless Channel Errors on the Quality of Real Time Ultrasound Video Transmission” in proceedings of the 28th IEEE EMBS Annual International Conference, 2006.

[2] David R. Bull, Edward J. Delp, Seishi Takamura, Thomas Wiegand, Feng Wu, "Introduction to the Issue on Emerging Technologies for Video Compression" IEEE Journal of Selected Topics in Signal Processing, vol. 5, no. 7, pp. 1277-1281, November 2011.

[3] J. Postel, User Datagram Protocol, RFC 768, USC/Information Sciences Institute, August 1980.
Available: http://tools.ietf.org/html/rfc768.

[4] Lars-Åke Larzon, Mikael Degermark, Stephen Pink, "Efficient Use of Wireless Bandwidth for Multimedia Applications" in proceedings of IEEE International Workshop on Mobile Multimedia Communications, 1999.

[5] Lars-Åke Larzon, Mikael Degermark, Stephen Pink, LarsErik Jaosson, Godred Fairhurst, The Lightweight User Datagram Protocol (UDP-Lite), Internet proposed standard RFC 3828, July 2004.
Available: http://tools.ietf.org/html/rfc3828.

[6] Mohamed M. Abo Ghazala, Mohamed F. Zaghloul, and Mohammed Zahra, "Performance Evaluation of Multimedia Streams Over Wireless Computer Networks (WLANs)" International Journal of Advanced Science and Technology, vol. 13, pp. 63-76, December 2009.

[7] Regina Reine, Dr. Godred Fairhurst, "MPEG-4 and UDPlite for Multimedia Transmission" in proceedings of Post Graduate Networking Conference, 2003.

[8] Amoolya Singh, Almudena Konrad, Anthony D. Joseph, "Performance evaluation of UDP-lite for cellular video" in proceedings of ACM NOSSDAV, 2001.

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Efficient Model For Video Transmission By UdpLite Protocol