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RESEARCH ARTICLE

An Efficient Real Time Video Multicasting Protocol and WLANs Cross-Layer Optimization in IEEE 802.11N

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Abstract- During the data transmission in multicasting using IEEE 802.11n WLANs standard there are two problems occurred is poor consistency and low data rate broadcast. So we are going to implement a new protocol in our project REMP (Reliable Efficient Multicast Protocol). To overcome the above problems this REMP is mainly suggested for MAC level Multicast protocol for increasing reliability and efficiency. The efficient is satisfied by the adjustment of the MCS (Modulation coding scheme) and reliability is satisfied selective for invalid multicast protocol. In additionally we are implemented the another protocol S-REMP (Scalable Reliable Efficient Multicast protocol) is for delivery of minimal quality video to all user and higher video quality is provided to the users exhibiting better channel conditions. Simulation results are implemented in our project.

Index Terms – NAK, ARQ, MAC, REMP, SREMP

I.INTRODUCTION

The IEEE 802.11 Wireless Local area network is said to be most popular technology. The main advantage of this technology is high data rate, low cost and easy deployment. Many mobile devices equip WLAN interface for its low cost and high speed of connectivity. The IEEE 802.11n WLAN Enhanced a Medium Access Control (MAC) protocol in order to decrease the MAC layer overhead. One of the key enhanced Medium Access Control is Aggregate MAC which is termed as (A-MPDU) which increases the throughput at the MAC Layer. In order to increase the reliability of the multicast transmission in WLANs, a variety of ARQ mechanisms have been proposed. They can be classified into individual ARQ for each multicast receiver, unicast like ARQ, and negative acknowledgment based (NAK-based) ARQ.

Due to its effectiveness, the NAK-based ARQ mechanism is the most widely adopted to various 802.11 multicast protocols. Here we mainly we focus on multicast transmissions over 802.11n WLANs. Most of existing multicast protocols for WLANs have been designed based on the legacy 802.11 MAC. Since 802.11n MAC has a backward compatibility with the legacy 802.11 MAC. In order to improve the performance of multicast services in IEEE 802.11n WLANs, we propose a novel MAC-level multicast protocol, named Reliable

and Efficient Multicast Protocol (REMP). By considering the A-MPDU aggregation, we introduce an advanced feedback mechanism for multicast transmissions. When the channel condition is dynamic, the AP exchanges control frames with all the multicast receivers. Based on feedbacks in the control frames, the AP selectively retransmits erroneous multicast frames and efficiently adjusts the modulation and coding scheme (MCS) under varying channel conditions. Although REMP can provide reliable multicast services to multicast receivers, it may heavily penalize receivers exhibiting better channel conditions. We consider the use of the scalable video coding technique that supports the flexible adaptation of video quality based on a hierarchical layer structure.

II.OVERVIEW

MULTICASTING OF SCALABLE VIDEO STREAMS OVER WiMAX NETWORKS

We consider WiMAX networks that transmit multiple video streams encoded in scalable manner to mobile receivers using the MBS feature. We focus on two research problems in such networks: (i) maximizing the video quality and (ii) minimizing energy consumption for mobile receivers. We formulate and solve the sub stream selection problem to maximize the video quality, which arises when multiple scalable video streams are broadcast to mobile receivers with limited resources. We show that this problem is NP-Complete, and design a polynomial time approximation algorithm to solve it.

We prove that the solutions computed by our algorithm are always within a small constant factor from the optimal solutions. In addition, we extend our algorithm to reduce the energy consumption of mobile receivers. This is done by transmitting the selected sub streams in bursts, which allows mobile receivers to turn off their wireless interfaces to save energy. We show how our algorithm constructs burst transmission schedules that reduce energy consumption without sacrificing the video quality. Using extensive simulation and mathematical analysis we show that the proposed algorithm: (i) is efficient in terms of execution time, (ii) achieves high radio resource utilization, (iii) maximizes the received video quality, and (iv) minimizes the energy consumption for mobile receivers.

RELIABLE MAC LAYER MULTICAST IN IEEE 802.11 WIRELESS NETWORKS

Media Access Control (MAC) remains a fundamental research problems in wireless networks, given the difficulties caused by transmission errors, collisions, and hidden nodes. These difficulties become even more severe when support is provided for multicast/broadcast communication in wireless networks. Such support is necessary for delivering acceptable quality of service in many applications of wireless communications, such as emergency reporting or videoconferencing.

Moreover, even in scenarios where applications themselves do not demand multicast/broadcast, several higher layer protocols rely heavily on reliable and efficient MAC layer multicast/broadcast, for instance DSR [8],AODV [16] and ZRP [7] routing protocols. It is important to note that multicast/broadcast in the MAC layer refers specifically to the process of sending a data frame to some all of the neighbors of a node. Henceforth in our presentation we treat broadcast as a special case of multicast.

RELIABLE MULTICAST IN MULTI–ACCESS WIRELESS LANS

Multicast is an efficient paradigm for transmitting data from a sender to a group of receivers. We focus on multicast in single channel multi–access wireless local area networks (LANs) comprising several small cells. In such a system, a receiver cannot correctly receive a packet if two or more packets are sent to it at the same time, because the packets “collide.” Therefore, one has to ensure that only one node sends at a time. We look at two important issues.

We consider the problem of the sender acquiring the multi–access channel for multicast transmission. Second, for reliable multicast in each cell of the wireless LAN, we examine ARQ–based approaches. The second issue is important because the wireless link error rates can be very high.

IEEE 802.11n AGGREGATION PERFORMANCE STUDY FOR THE MULTICAST

The IEEE 802.11n is known to be the next generation technology for the high throughput wireless networks. It allows data rates up to 600 Mbps. With its high capacity, this solution becomes commonly used within new communication devices. The reduced efficiency of the legacy 802.11 MAC layer was firstly resolved by 802.11e using the Block frame and the Block Acknowledgement transfers, and then enhanced by

802.11n using frame aggregation. Thus two aggregation schemes are defined: MAC Service Data Unit Aggregation (AMSDU) and MAC Protocol Data Unit Aggregation (A-MPDU). Transmitting to a group address (broadcast or multicast). Hence the reliability of the multicast is hugely reduced compared to the unicast.

III.RELATED WORK

High data rate, low cost and easy deployment are the advantages of the IEEE 802.11 WLAN (wireless local area network) have been one of the most well-liked wireless access technologies. For the low cost and the high speed internet connectivity mobile devices which include PDAs, laptop and mobile phones equip the WLAN interface. MAC (Medium Access Control) enhancements of 802.11n is one type for collective MAC protocol data unit AMPDU (Aggregate MAC Protocol Data Unit) aggregation, throughput at the MAC layer is maximized, with the successful deployment of IEEE 802.11 WLANs and boost in applications that need multicast services such as IPTV and Internet streaming, multicast communications over IEEE 802.11 WLANs have received much attention. As a simple broadcasting mechanism without acknowledgement from the receivers.

DISADVANTAGES

1. Multicast frames are transmitted as a simple broadcasting mechanism without acknowledgments from receivers. Due to the absence of automatic repeat request (ARQ) mechanisms, the reliability of multicast frames cannot be guaranteed, especially when the probability of collisions or bit errors is high.
2. A low and fixed transmission rate is used for multicast transmissions. Although there have been several rate adaptation mechanisms for unicast transmissions in WLANs, they cannot be directly applied to multicast transmissions since the sender does not receive any feedback from receiver.

IV.PROPOSED SYSTEM

Various ARQ mechanisms have been proposed for the reliability of multicast transmission in WLANs, to improve the consistency of multicast transmissions in WLANs, a variety of ARQ mechanisms have been proposed. There is individual ARQ (Automatic Repeat Request) for each multicast receiver, unicast-like ARQ, and negative acknowledgement based (NAK-based) ARQ which is been off the record. The NAK-based ARQ mechanism is the most commonly adopted in various 802.11 multicast protocols, due to its usefulness. Several rate adaptation mechanisms are proposed for using the highest possible data rate enabling the provisioning of reliable multicast transmissions. Only by the local acknowledgement from the sender and the receivers the data rate is determined in this mechanism. Here we mainly focus on the multicast transmission OVER 802.11N WLANs.

Previously the multicast protocols which is been used is designed in such a manner based on the legacy of 802.11 MAC. It has a backward compatibility. By using the NAK-based ARQ Mechanism in multicast protocol which results in unnecessary retransmission for AMPDU frames. Block acknowledgement mechanism for A-M PDU transmission conflicts with NAK-based ARQ mechanism.

ADVANTAGES

1. We focus on multicast transmissions over 802.11n WLANs.
2. The reliable multicast protocols that use the NAK-based ARQ mechanism may result in unnecessary retransmissions for AMPDU frames.
3. In order to improve the performance of multicast services in IEEE 802.11n Wanes, we propose a novel MAC-level multicast protocol, named Reliable and Efficient Multicast Protocol (REMP). By considering the A-MPDU aggregation, we introduce an advanced feedback mechanism for multicast transmissions.

V.FUTURE WORK AND CONCLUSION

As our future work we are planning to implement REMP and S-REMP by modifying open source WLAN drivers and measure the performance in real system. In our project S-REMP to guarantee minimal video quality to all users in future work to guarantee a maximal video quality to all users.

I proposed a novel MAC-level multicast protocol named REMP that enhances the reliability and efficiency of multicast transmissions in IEEE 802.11n WLANs. In REMP, AP selectively retransmits erroneous multicast frames and dynamically adjusts MCS under varying channel conditions based on the advanced feedback mechanism from multicast receivers. In addition, i proposed S-REMP, an extended version of REMP, for efficient delivery of scalable video over IEEE 802.11n WLANs. In S-REMP, different layers of scalable video can be transmitted with different MCSs to provide the minimal video quality to all users while providing a higher video quality to users exhibiting better channel conditions. Via extensive simulation results, we proved the effectiveness of the proposed protocols.

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