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Multicasting of Bandwidth Efficient Video in Multiradio Multicellular Wireless Network

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Abstract: Video Multicasting is one of the most challenging applications in today's scenario. Because of the growth of digital communication and multimedia application, both the multicasting and security becomes an important issue of video. Frame encryption is one the way to ensure security in vide multicasting. We can provide quality based secured video multicasting by the survey we are publishing here. Many different security measures are available for the multicasting of video here we can provide content based security. In this paper survey of quality based video multicasting for different bitrate with security have been discussed from which researchers can get an idea for efficient techniques to be used.
Keywords: Quality Differentiated Multicast (QDM), Multicasting and Content based Security.

I. INTRODUCTION

Due to increase in internet usage and low cost and high availability of digital data, the communication network usage has increased, security gains important and vital role. It requires high protection of data. While dealing with video data it is even more challenging to provide security most probable security criteria is authentication. In the multicasting of video data we aware of QDM[1] Quality Differentiated Video Multicast in Multirate wireless network shows efficient way of multicasting stream of video data over group of client. In this multicasting of data we can only provide authentication of clients in various scenarios hence we are dealing with the security procedures for the same in this paper to prevent videos from unauthorized access. Wireless multicast nature is amazing concept to manage bandwidth requirement while multicasting video over multiple bitrate network devices has different modulation scheme [1], this will waste the bandwidth if a member in multicast is having higher bit rate which desire good quality. To overcome this problem dynamic rate adaptation scheme with quality differentiated feature prposed[1]. In this paper we are dealing with the information security on this approach of QDM & dynamic rate adaptation also on parameters like time and loss probability. For Information Security we have Content-Aware protocol for Secure Multicast(CASM)[2]. CASM on video distribution integrate three modules 1) Group key management algorithm; 2) A content-aware key embedding algorithm; 3) Two-level video encryption algorithm. For encryption and decryption key is used key management algorithm securely share and update key for encryption in data embedding key is embedded into video data while encryption module implements encryption algorithm.

II. PERFORMANCE PARAMETERS

A. Loss Probability:

Packet loss occurs when packet fails to reach its destination. The probability of packet loss can also affect multicasting.

B. Time:

Time required transmitting subset of frames over the network as we are dealing with the multirate network hence bandwidth heterogeneity of client effect time.

C. Video Quality:

Video quality or visual quality is quality of video to be transmitted. As we have heterogenic clients and hence our motive is to maintain the highest quality as per their bandwidth requirement.

D. Visual Degradation:

This criterion measures the perceptual distortion of the video data with respect to the plain video. In some applications, it could be desirable to achieve enough visual degradation, so that an attacker would still understand the content but prefer to pay to access the unencrypted content. However, for sensitive data, high visual degradation could be desirable to completely disguise the visual content[3].

E. Encryption Ratio:

This criterion measures the ratio between the size of encrypted part and the whole data size. Encryption ratio has to be minimized to reduce computational complexity[3].

F. Speed:

Encryption and decryption algorithms should be fast enough to meet real time requirements [3].

III. LITERATURE SURVEY

1. Rate Adaptive Video Multicast in Multirate Wireless Networks

V.Venkatramani, R.Madhanmohan et.al. [4] Proposed Adapting modulation and transmission bit-rates for video multicast in a multi rate wireless network is a challenging problem because of network dynamics, variable video bit-rates and varied clients who may expect differentiated video qualities. Prior work on the leader-based schemes selects the transmission bit-rate that provides reliable transmission for the node. In this paper, we investigate a rate-adaptive video multicast scheme that can provide varied clients differentiated visual qualities matching their channel conditions. We propose a rate scheduling model that selects the optimal transmission bitrates for each video frame to maximize the total visual quality for a multicast group subject to the minimum-visual-qualityguaranteed constraint. We then present a practical and easy-to-implement protocol, called Quality- Differentiated Multicast (QDM), which constructs a cluster-based structure to characterize node difference and adapts the transmission bit-rate to network dynamics based on video quality. Since QDM selects the rate by a sample-based technique, it is suitable for real-time working. We propose a practical protocol, called Quality-Differentiated Multicast (QDM), which exploits a sample based technique to adapt the transmission bit-rate of each video frame to variable video bitrates and client mobility without the need of any preprocess. Thus, it can be applied to real-time video streaming it is a cluster-based structure it is suitable for real-time streaming even without any pre –process QDM transmission to variable bit-rate QDM using video-bit rates.

2. Bandwidth Efficient Video Multicasting in Multi-radio Multi-cellular Wireless Networks.

D.-N. Yang and M.-S. Chen et.al.[5] proposed in this paper, we propose a new mechanism to select the cells and the wireless technologies for layer-encoded video multicasting in the heterogeneous wireless networks. Different from the previous mechanisms, each mobile host in our mechanism can select a different cell with a different wireless technology to subscribe each layer of a video stream, and each cell can deliver only a subset of layers of the video stream to reduce the bandwidth consumption. We formulate the Cell and Technology Selection Problem (CTSP) to multicast each layer of a video stream as an optimization problem. We use Integer Linear Programming to model the problem and show that the problem is NP-hard. To solve the problem, we propose a distributed algorithm based on Lagrangean relaxation and a protocol based on the proposed algorithm. Our mechanism requires no change of the current video multicasting mechanisms and the current wireless network infrastructures. Our algorithm is adaptive not only to the change of the subscribers at each layer, but also the change of the locations of each mobile host. In this paper, we propose a new mechanism to select the cells and the wireless technologies for layerencoded video multicasting in heterogeneous wireless networks. Each mobile host in our mechanism can select a different cell to subscribe each layer of the video stream, and each cell can multicast only a subset of layers of the video stream to reduce the bandwidth consumption.

3. Video Rate Adaptation and Scheduling in Multi-Rate Wireless Networks

S. Pal, S.R. Kundu, A.R. Mazloom, and S.K. Das et.al.[6] stated Current scheduling techniques used for cellular networks do not suffice for the emerging multi-rate systems like cdma2000 and High Data Rate (HDR). Real-time applications like video streaming must comprehend the channel conditions and consequently the data rates that are currently being supported; accordingly the content and the amount of data to be transmitted needs to be adapted to the available bandwidth. In this paper, we have considered multimedia (MPEG-4) streaming as the application over HDR and propose a content aware scheduling scheme (CAS) that takes into consideration the different priorities of the MPEG- 4 stream content. The proposed transmission scheme considers both the channel conditions as perceived by the user as well as the priority of the streams. In addition, CAS verifies the playout timestamp and discards stale packets ensuring higher throughput in the process. We capture the lag of the proposed adaptation scheme using the Kullback-Leibler distance and show that the rate adaption scheme has a reasonably small lag. Simulation results demonstrate that the proposed scheme results in higher overall peak signal to noise ratio (PSNR) values of the entire movie, lesser number of dropped frames, and a better throughput utilization over existing schemes. This paper deals with rate adaptation at the MAC layer which is necessary for streaming multimedia over multi-rate wireless systems. We propose a rate adaptation technique where the application layer encoding rate is dynamically adjusted to the varying channel conditions perceived by the user.

4. Dynamic Rate and FEC Adaptation for Video Multicast in Multi-Rate Wireless Networks.

O. Alay, T. Korakis, Y. Wang, and S. Panwar et.al.[7] Video multicast over Wireless Local Area Networks (WLANs) faces many challenges due to varying channel conditions and limited bandwidth. A promising solution to this problem is the use of packet level Forward Error Correction (FEC) mechanisms. However, the adjustment of the FEC rate is not a trivial issue due to the dynamic wireless environment. This decision becomes more complicated if we consider the multi-rate capability of the existing wireless LAN

technology. In this paper, we propose a novel method which dynamically adapts the transmission rate and FEC for video multicast over multi-rate wireless networks. In order to evaluate the system experimentally, we implemented a prototype using open source drivers and socket programming. Our experimental results show that the proposed system significantly improves the multicast system performance. The proposed rate and FEC adaptation scheme is developed assuming the video rate can be adapted. Note that since we have different transmission rates, we need videos at different rates, furthermore for each transmission rate. In this paper, we propose a novel method which dynamically adapts the transmission rate and FEC for video multicast over multi rate wireless networks. In order to evaluate the system experimentally, we implemented a prototype using open source drivers and socket programming.

5. Combining the Rate Adaptation and Quality Adaptation Schemes for Wireless Video Streaming.

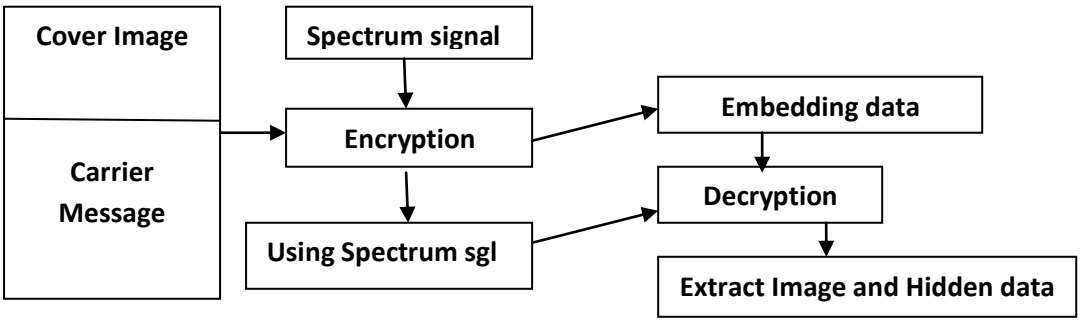
S. Lee and K. Chung et.al.[8] Proposed a Dynamic Stream Merging (DSM) technique for efficient video-on-demand services to mobile users in wireless mesh networks at the edges. DSM is a new communication paradigm, in which multicast topologies are created incrementally through dynamic merging of server streams at the mesh nodes. This is accomplished without the knowledge of the server. The formation of the multicast group in this manner is fundamentally different from traditional multicast techniques which rely on centralized control at the server. We present a system prototype and give experimental results to demonstrate the feasibility of this new approach. We also give simulation results based on the NS-2 simulator to show the performance efficiency in a larger system setting. We present the details of the Dynamic Stream Merging technique in this section. We first discuss how to identify video streams in the network layer. We then present the strategy for the base case, namely merging two outgoing streams at a node. This base technique, called 2-stream merging, is then used to handle the general case of merging multiple streams. Finally, we present the buffer management scheme in DSM. We propose two operations, namely the Merge Operation and the Cancel Operation, to facilitate dynamic merging and splitting of streams in WMN's. The Merge Operation merges two streams at the communication link between a UN and a DN. The UN and the DN cooperate with each other to update the affected M-trees by updating their own Session Table.

6. The SecureRing Protocols for Securing Group Communication

Kim Potter Kihlstrom, L. E. Moser, P. M. Melliar-Smith et.al.[13] proposed Byzantine faults such as might be caused by modifications to the programs of a group member following illicit access to, or capture of, a group member. We describe here SecureRing, a suite of group communication protocols that provide protection against Byzantine faults. These protocols multicast messages to groups of processors within an asynchronous distributed system, impose a consistent total order on messages, and maintain consistent group memberships. The approach adopted by SecureRing to protect against Byzantine faults is to optimize the performance for normal (fault-free) operation and to pay a performance penalty when a Byzantine fault is detected, which is expected to be rare. In future detectable Byzantine faults are eventually excluded from the membership. To provide these message delivery and group membership services, the protocols make use of an unreliable Byzantine fault detector.

IV. PROPOSED SYSTEM

We present here novel secured quality differentiated video multicasting for multi-rate heterogenic clients[1] and the security is provided by means of content aware secured multicast protocol[2] the information security is done through this process. Video image is encrypted through the key message only DC component and motion vectors of video are only encrypted. The encrypted data is then integrated with key message and the rekey is provided through the embedded data. Steganographic data is forwarded through the any of 802.11 standards.



V. CONCLUSION

After reading the literatures, we find problem of security in the QDM protocol. CASM can be used to secure the multicasting video on 3 steps. Broadcasting nature can allow the video streaming to be accessed by the unauthorized user hence here we can secure video by emerging digital signature to the video data by means of steganography over the network so that no unauthorized user can able to decrypt the video. QDM provide the best multirate multicasting of video and we can provide security in the QDM. Data embedding, Group key management and Selective encryption can be emerged into the QDM protocol we embed rekey message to avoid separate control channel for key transmission for the clients. We encrypt motion vectors and DC components only. Modified version of these combined algorithms can provide extreme quality based multirate multicasting of QDM with the great security based on Content aware secure multicasting of video.

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