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QoS Parameters Based Efficient Video Content Distribution by Using Effective Bandwidth

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***Abstract*— Most of the user's concerned the same content in on video broadcast. In order to improve efficient delivery and to reduce network utilization, mobile to mobile collaboration is very important in the real time video broadcast for multiple users. Whatever contribution made in the real-time video broadcast, end-to-end delay bounds is very significant for wireless communication. Though video transmission given to the user in efficient manner, some of the faults are not guarantees in the video distribution. The faults are fading channels, deterministic delay bounds, these are all happens due to the innate stochastic disposition of wireless. Some of the services in the video transmission provide guarantees to the users. The guarantee services like effective bandwidth/ capacity is provided to the user. By using the effective bandwidth and effective capacity in the video broadcasting, service achieves high standard of quality. By using these concepts, we address the problem of resource distribution in the network flows and also reduction of total energy consumed by the end-to-end delay bonds on the every network paths. Our proposed method using shared way for resource allotment at each and every node of the video transmission. We also propose the algorithm for the flow selection in the real time video transmission using wireless networks. The videos are transmitted at less complexity by using proposed algorithms. According to the channel conditions, the resource allocation and flow selection in the video transmission is required for each and every videos frame used. Our proposed resource allocation and flow selection algorithms are applied at different topologies for experimental result. It showed effective and efficient performance gains at low cost and less complexity.**

***Keywords*— Scalable video coding, real-time video broadcast, statistical QoS guarantees, mobile-to-mobile cooperation, algorithms, flow selection, capacity.**

I. INTRODUCTION

Quality of service (QoS) is very important for all type of works. For example, if user wants to buy one thing means, they wants first quality and then prices and so on. If the customer or user got satisfied only through the quality of service provides. So the quality of services is also very important in the real-time videos broadcast and guarantees for an end user satisfaction with delay bounds. First AVC coding is used for video transmission and this coding gives the effective works in the transmission. And then new idea implements and applies SVC coding for the videos transmission. In this coding gives way to video quality ignominious due to the bit stream using different bitrates. So the video source rate achieved at the temporal.

In a wireless networks, some delay bounds are very expensive to secure and also to provides a real and exact pattern for QoS. The idea used in the Statistical QoS is well developed effective bandwidth and effective capacity. This notion is used for effective real-time video transmission. For quality video transmission, the dual concept of the effective capacity and theory of effective bandwidth are used and also QoS exponents are used in each video layer. The problem of providing statistical delay bounds for layered video transmission over single hop unicast and multicast links was considered in [9]. For general multihop multicast network scenarios, it is inefficient to allocate resources independently among network links since the variation in the supported service rates among different links affects the end-to-end transport capability in the network.

In order to improve efficient delivery and to reduce network utilization, mobile to mobile collaboration is very important in the real time video broadcast for multiple users. Whatever contribution made in the real-time video broadcast, end-to- end delay bounds is very significant for wireless communication. In wireless networks, mobile devices is best for performance gains, perfect networks coverage, reduce the communication cost at the end-user and also less energy consumption for the communication. How mobile device is best for wireless networks communication are shown in the following reasons: 1. The ICAM architecture presents an integrated cellular and ad hoc multicast scheme to increase the cellular multicast throughput through the use of mobile stations (MSs) as ad hoc relays [13]. 2. In UCAN architecture, the mobile stations increases the networks coverage area using

the WLAN as interface. 3. In [19], MSs are assumed to be connected to several wireless networks with different characteristics in terms of bandwidth, packet loss probability, and transmission cost. A near optimal solution is shown to reduce end user cost while meeting distortion and delay constraints.

The advantages of the collaboration among the mobile to mobile communication have been allowed for the video streaming applications. In CHUM architecture, Most of the user's concerned the same content in on video broadcast. In order to improve efficient delivery and to reduce network utilization, mobile to mobile collaboration is very important in the real time video broadcast for multiple users. In [27], the authors propose distributed video scheduling schemes for multiradio multihop wireless networks to minimize video distortion and ensure distortion-fairness sharing among multiple description video streams. The distortion model is constructed to provide a balance between the selfish motivation of minimizing video distortion and the global performance of minimizing network congestion.

The mobile devices are very essential in the wireless communication systems because the devices are used for minimizing the energy consumption. In order to reduce the energy consumption, the mobile devices play an important role by using the cooperation of communication architectures and enhancement schemes. In [22], cooperative network architecture is presented and experimentally evaluated to reduce energy consumption in multiradio mobile devices for video streaming applications. In [30], a comprehensive experimental study is conducted where results presented demonstrate notable energy reduction gains by collaborative downloading. The services like effective bandwidth/ capacity is provided to the user. By applying this concept in the video broadcasting, service achieves high standard of quality. By using this notion, we address the problem of resource distribution in the network flows and also reduction of total energy consumed by the end-to-end delay bonds on the every network paths. Our proposed method using shared way for resource allotment at each and every node of the video transmission. We also propose the algorithm for the flow selection in the real time video transmission using wireless networks. The videos are transmitted at less complexity by using proposed algorithms. According to the channel conditions, the resource allocation and flow selection in the video transmission is required for each and every videos frame used. Our proposed resource allocation and flow selection algorithms are applied at different topologies for experimental result. It showed effective and efficient performance gains at low cost and less complexity.

II. RELATED WORKS

In this section, we briefly discuss the works which is similar techniques as our approach but serve for different purposes.

T. Wiegand, G. Sullivan, G. Bjontegaard, and A. Luthra [1], in this paper H.264/AVC is newest video coding standard of the ITU-T Video Coding Experts Group and the ISO/IEC Moving Picture Experts Group. The main goals of the H.264/AVC standardization effort have been enhanced compression performance and provision of a "network-friendly" video representation addressing "conversational" (video telephony) and "non conversational" (storage, broadcast, or streaming) applications. H.264/AVC has achieved a significant improvement in rate-distortion efficiency relative to existing standards. This article provides an overview of the technical features of H.264/AVC, describes profiles and applications for the standard, and outlines the history of the standardization process.

H. Schwarz, D. Marpe, and T. Wiegand [2], in this paper with the introduction of the H.264/AVC video coding standard, significant improvements have recently been demonstrated in video compression capability. The Joint Video Team of the ITU-T VCEG and the ISO/IEC MPEG has now also standardized a Scalable Video Coding (SVC) extension of the H.264/AVC standard. SVC enables the transmission and decoding of partial bit streams to provide video services with lower temporal or spatial resolutions or reduced fidelity while retaining a reconstruction quality that is high relative to the rate of the partial bit streams. Hence, SVC provides functionalities such as graceful degradation in lossy transmission environments as well as bit rate, format, and power adaptation. These functionalities provide enhancements to transmission and storage applications. SVC has achieved significant improvements in coding efficiency with an increased degree of supported scalability relative to the scalable profiles of prior video coding standards. This paper provides an overview of the basic concepts for extending H.264/AVC towards SVC. Moreover, the basic tools for providing temporal, spatial, and quality scalability are described in detail and experimentally analyzed regarding their efficiency and complexity.

C.-S. Chang and J. Thomas [5], the theory of large deviations provides a simple unified basis for statistical mechanics, information theory and queuing theory. The objective of this paper is to use large deviation theory and the Laplace method of integration to provide an simple intuitive overview of the theory of effective bandwidth for high-speed digital networks, especially ATM networks. This includes (1) identification of the appropriate energy function, entropy function and effective bandwidth function of a source, (2) the calculus of the effective bandwidth functions, (3) bandwidth allocation and buffer management, (4) traffic descriptors, and

(5) envelope processes and conjugate processes for fast simulation and bounds.

D. Wu and R. Negi [6], to facilitate the efficient support of quality of service (QoS) in next-generation wireless networks, it is essential to model a wireless channel in terms of connection-level QoS metrics such as data rate, delay, and delay-violation probability. However, the existing wireless channel models, i.e., physical-layer channel models, do not explicitly characterize a wireless channel in terms of these QoS metrics. In this paper, we propose and develop a link-layer channel model termed effective capacity (EC). In this approach, we first model a wireless link by two EC functions, namely, the probability of nonempty buffer, and the QoS exponent of a connection. Then, we propose a simple and efficient algorithm to estimate these EC functions. The physical-layer analogs of these two link-layer EC functions are the marginal distribution (e.g., Rayleigh-Ricean distribution) and the Doppler spectrum, respectively. The key advantages of the EC link-layer modelling and estimation are: 1) ease of translation into QoS guarantees, such as delay bounds; 2) simplicity of implementation; and 3) accuracy, and hence, efficiency in admission control and resource reservation. We illustrate the advantage of our approach with a set of simulation experiments, which show that the actual QoS metric is closely approximated by the QoS metric predicted by the EC link-layer model, under a wide range of conditions.

D. Wu and R. Negi [7], an important objective of next-generation wireless networks is to provide quality of service (QoS) guarantees. This requires a simple and efficient wireless channel model that can easily translate into connection-level QoS measures such as data rate, delay and delay-violation probability. To achieve this, in Wu and Negi (IEEE Trans. on Wireless Communications 2(4) (2003) 630-643), we developed a link-layer channel model termed effective capacity, for the setting of a single hop, constant-bit-rate arrivals, fluid traffic, and wireless channels with negligible propagation delay. In this paper, we apply the effective capacity technique to deriving QoS measures for more general situations, namely, (1) networks with multiple wireless links, (2) variable-bit-rate sources, (3) packetized traffic, and (4) wireless channels with non-negligible propagation delay.

Xi Zhang and Qinghe Du [10], in this article we propose a cross-layer design model for multimedia multicast/broadcast services to efficiently support the diverse quality of service requirements over mobile wireless networks. Specifically, we aim at achieving high system throughput for multimedia multicast/ broadcast while satisfying QoS requirements from different protocol layers. First, at the physical layer, we propose a dynamic rate adaptation scheme to optimize the average throughput subject to the loss rate QoS constraint specified from the upper-layer protocol users. We investigate scenarios with either independent or identically distributed (i.i.d.) or non-i.i.d. fading channels connecting to different multicast receivers. Then, applying the effective capacity theory at the data link layer, we study the impact of the delay QoS requirement (i.e., QoS exponent) on the multimedia data rate of mobile multicast/broadcast that our proposed scheme can support. Also presented are simulation results which show the trade-off among different QoS metrics and the performance superiority of our proposed scheme as compared to the other existing schemes.

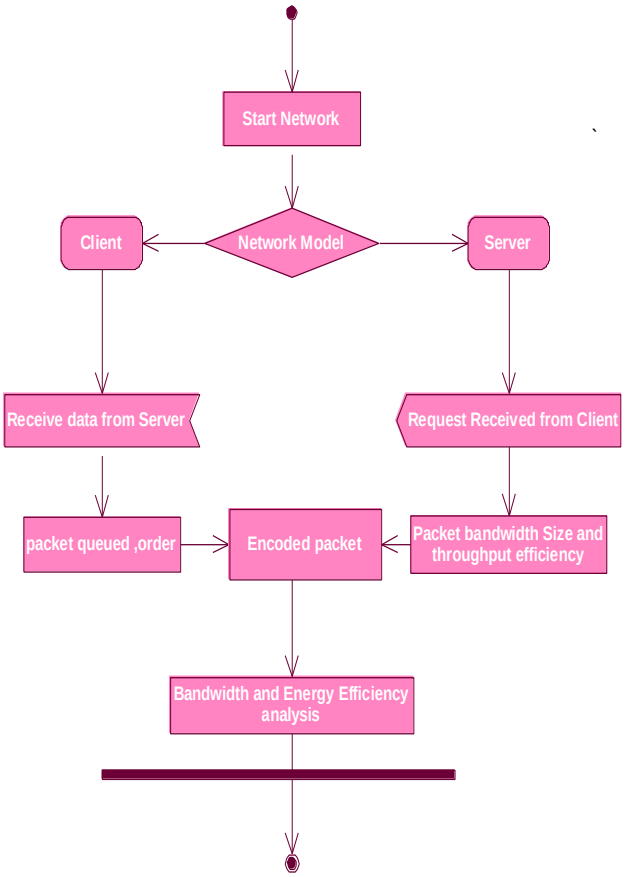
Liang Zhou, Xinbing Wang, Wei Tu, Gabriel-Miro Muntean, and Benoit Geller [27], An important issue of supporting multi-user video streaming over wireless networks is how to optimize the systematic scheduling by intelligently utilizing the available network resources while, at the same time, to meet each video's Quality of Service (QoS) requirement. In this work, we study the problem of video streaming over multi-channel multi-radio multihop wireless networks, and develop fully distributed scheduling schemes with the goals of minimizing the video distortion and achieving certain fairness. We first construct a general distortion model according to the network's transmission mechanism, as well as the rate distortion characteristics of the video. Then, we formulate the scheduling as a convex optimization problem, and propose a distributed solution by jointly considering channel assignment, rate allocation, and routing. Specifically, each stream strikes a balance between the selfish motivation of minimizing video distortion and the global performance of minimizing network congestions. Furthermore, we extend the proposed scheduling scheme by addressing the fairness problem. Unlike prior works that target at users' bandwidth or demand fairness, we propose a media-aware distortion-fairness strategy which is aware of the characteristics of video frames and ensures maxmin distortion-fairness sharing among multiple video streams. We provide extensive simulation results which demonstrate the effectiveness of our proposed schemes

III. PROPOSED WORK

The real-time video transmission provides to the user in efficient manner, but some faults in the video distributions are not guarantees. The faults are fading channels, deterministic delay bounds, these are all happens due to the innate stochastic disposition of wireless networks. At the same time, some services in the video transmission provide guarantees to the users. The guarantee services like effective bandwidth/ capacity is provided. By applying the effective bandwidth and effective capacity, service achieves high standard of quality in the videos distribution. In order to overcome the obstacles in the existing system, we propose the resource allocations and flow selection schemes in this paper. By using above concept, we address the problem of resource distribution in the network flows and also to reduce the total energy consumed by the end-to-end delay bonds on the every network paths. Our proposed method using shared way for resource allotment at

each and every node of the video transmission. We also propose the algorithm for the flow selection in the real time video transmission using wireless networks. The videos are transmitted at less complexity by using proposed algorithms. According to the channel conditions, the resource allocation and flow selection in the video transmission is required for each and every videos frame used. We propose the two algorithms for effective real-time video transmission. By updating the flow selection and optimal resource allocations schemes in the channel states, our proposed algorithms effectively reselect the best network flow and reconfigure the service process on each link to provide optimized end-to-end transport.

IV. Simulation Works/Results



V. Conclusion

We successfully proposed the optimal resource allocation and flow selection for entire networks in this paper. For scalable real-time video broadcast, we obtained the optimal resource allocation for to reduce the total energy consumption by the multihop networks and subject to end-to-end statistical delay bounds per network path. The solution of the proposed resource allocations, is used to identify the optimized energy-efficient flows have the hybrid unicast / multicast links. This links ensure that reliable delivery of the same video content to all requesting mobile users. Our proposed algorithm for flow selection is used to reduce the complexity in the video distribution and this algorithm also helps to reduce the complexity at low cost. The evaluation and experimental analysis showed that our proposed algorithms are working efficiently in the real-time video broadcast to the users. Results demonstrate notable reductions in energy consumption and the performance of the approximation algorithms is close to optimal for various network topologies.

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