

Adaptive Hybrid Transmission Mechanism for Free Space Optical Communication Network

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ABSTRACT: In this paper, we propose an Adaptive Hybrid Transmission schemes for free space optical communication. Proposed algorithm utilizes hybrid mechanism which combines Multi-channel multicasting and unicast scheme to enhance not only service over service blocking probability but also reduce overall bandwidth consumption of the free space optical communication system which has very limited resources compared to optical fiber communication. An adaptive resource allocation algorithm is also proposed and is shown to achieve minimum blocking probability. In order to evaluate the performance we compare proposed algorithm against traditional unicast and multicast schemes.

KEYWORDS: Adaptive, Free space, optical, hybrid,

I. INTRODUCTION

AS the demand for Internet and Internet-based applications grows around the world, Internet Protocol Television (IPTV) [1] has been becoming popular as it promises to deliver multimedia contents to users whenever they want and wherever they are. At the same time, with the creation of new applications and contents growing exponentially, multimedia streaming over wireless networks has emerged as an important technology and has attracted much attention with the convergence of broadcasting and networks, IPTV, a broadcasting service using the IP network, has become popular as a new business model. Furthermore, demand for IPTV service in wireless networks is expected to increase. The widely deployed IEEE 802.11 network is considered today as the de-facto wireless access network for what are known as last mile connections. It is a promising candidate for the delivery of Mobile IPTV [1]. Several reliable multicast MAC protocols have been proposed recently. However, little progress has been made in making any of these appropriate for mobile IPTV in terms of efficient network resource allocation. The primary aim of this paper is to present a new network resource allocation scheme for Mobile IPTV that maximizes the potential number of users. To offer QoS-guaranteed IPTV service, the TV viewing characteristics of user is analyzed by adopting a heterogeneous MAC protocol for a multicast service. Among the various IPTV services, the Video-on-demand (VOD) service, which offers watching a selected video at anytime and anywhere through the wireless access network, is taking the major service portion? Since users prefer to access content on-demand, rather than following a fixed schedule, most of the Video-on-Demand service is designed to deliver their video by unicast manner to meet the 'any time', 'on-demand' characteristics. From the network control perspective, it is simple and works fine when there is enough capacity and the service request rate is moderately low. However, if video requests are highly skewed, for example, the famous sports game or popular movies, then, large number of the unicast streams for the same content would be established and transmitted over the network. These results cause huge inefficiency of both media server and bandwidth consumption of wireless system which has very limited resources compared to wired networks. In case of mobile VOD [2] services, the bottleneck has been observe in wireless access network rather than multimedia server. To overcome this problem we are going for AHT mechanism" which is combination of both unicast and multicast transmission. In this mechanism the most popular video is transmitted by multicast transmission, and normal video is transmitted by unicast transmission. The decision of which contents are going to be transmitted by the multi-channel multicasting is decided by proposed adaptive resource allocation method that results in the lowest blocking Probability.

II. RELATED WORKS

In this section, we briefly review the existing VOD systems. Generally, VOD systems can be categorized into True-VOD(TVOD), which is based on unicast [2] transmission, and Near-VOD (NVOD), which is based on broadcast or multicast transmission, [4]-[7] how videos are delivered. In TVOD, the system reserves dedicated transmission channels from server resources to each client so that clients can receive video data without any delay via dedicated transmission channels as if they use their own VCR. However, may easily run out of the channels because the channels can never keep up with the growth in the number of clients. On the other hand, in NVOD, clients have to wait by some delay time because content is multicast over several channels with periodical cycle. The number of broadcasting channels is due to the allowable viewer's waiting time, not the number of requests. Thus, this approach is more appropriate for popular videos that may interest many viewers at a certain period of time. Clearly, the popularity of access pattern of video objects plays an important role in determining the effectiveness of a video delivery technique. Because different videos are requested at different rates and at different times, videos are usually divided into hot (popular) and cold (less popular), and requests for the top 10 20 videos are known to constitute 60 80% of the total demand. So, it is crucial to improve the service efficiency of hot videos. Until now, many NVOD methods have been proposed, such as the staggered broadcasting [3], pyramid broadcasting [4] fast broadcasting [5] staircase broadcasting [6] harmonic broadcasting [7] and etc.

III. CONCLUSION

In this paper, we have addressed the AHT algorithm that can efficiently provide mobile IPTV service. Proposed algorithm combined unicast and multichannel multicast mechanism that enhances not only service blocking probability but also reduces overall bandwidth consumption of the system. From the numerical analysis, we compared proposed algorithm against traditional unicast and multicast schemes. As a result, proposed scheme is able to improve IPTV service blocking probability

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