TRM-BASED MULTIMEDIA STREAMING OPTIMIZATION SCHEME IN WIRELESS NETWORKS

Chong Deuk Lee[1], Taeg Won Jeong[1], Kyung Soo Han[2]
and Jeong Yong Ahn[2,*]

[1]Division of Electronic Engineering
[2]Department of Statistical Informatics (Institute of Applied Statistics)
Chonbuk National University
Jeonju, Korea
{ cdlee1008; kshan }@jbnu.ac.kr; ttwjeong@yahoo.co.kr
*Corresponding author: jyahn@chonbuk.ac.kr

ABSTRACT. *This paper is to propose a TRM (transmission rate monitoring) based streaming optimization scheme to minimize packet loss and improve QoS (quality of service) in wireless networks. The proposed scheme is based on the trade-off relationship between transmission rate monitoring and overhead monitoring. For this purpose, we propose a monitoring-based optimization method which optimizes congestion and delay. Simulation results show that the proposed scheme is more efficient than RED (random early detection) scheme and TFRC (TCP-friendly rate control) scheme.*
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1. **Introduction.** In wireless networks, congestion occurs mainly when there are too many packets for the network to process or the sender transmits more packets than the receiver can accept. Congestion degrades the performance of multimedia streaming. The congestion control in wireless networks, therefore, plays an important role for throughput efficiency and provides playback quality in multimedia applications in addition to supporting fairness and responsiveness of the protocol [12].

Recently, TCP (transmission control protocol) has been used for multimedia streaming in wireless networks. TCP-based streaming, however, has problems of frequent disconnection and packet loss because of the sensitivity to delay and congestion [10, 17]. In the point of unicast, TCP-based streaming is efficient in cases of wide bandwidth and short delay in the terminal [9]. However, TCP-based streaming is not efficient for multimedia streaming in the point of multicast. In cases of limited bandwidth and long delay in the terminal, TCP-based streaming has the problem of reliability due to congestion and delay.

To solve this problem, there are proposed many TCP-friendly schemes such as Window-based schemes, rate-based schemes and RED (random early detection) schemes. RED is a basic scheme to reduce congestion [4]. TFRC (TCP-friendly rate control), a rate-based scheme, is efficient for unicast flow of constant packet size [5]. The scheme provides high transmission rate under constant conditions for packet size, packet loss rate and RTT (round trip time). However, these schemes have many problems. For example, they cannot correctly find the cause of error due to packet loss and guarantee the fairness and responsiveness of transmission rate. In addition, their optimization rate is comparatively low. As a result, they don't have high throughput and average response rate.

In this article, we propose a novel streaming optimization scheme, TRMOS (transmission rate monitoring-based optimization scheme), to improve throughput efficiency