

Adaptive Retransmission Methods in IP Networks

Author: **Árpád HUSZÁK**, PhD student

Consultant: **Dr. Sándor IMRE**, docent

Institute: Budapest University of Technology and Economics, Faculty of Electrical Engineering and Informatics, Department of Telecommunication, Mobile Communication Laboratory

The popularity of newly appeared multimedia applications is growing intensively, but there are a lot of new and interesting problems that must be solved. In wireless environment the obstacles of its popularity are the higher bit error ratio of the radio channel and the limited bandwidth of the mobile links. The frequent losses degrade the quality of the video streams therefore new methods should be investigated to increase the number of successfully received packets. To minimize the end-to-end packet loss ratio the packet loss should be either prevented or subsequently handled.

We propose a selective retransmission scheme based on the DCCP transport protocol. It disables or enables the retransmission of lost packets according to the current state of the network. To decide whether to retransmit a lost packet congestion control protocol is used. The congestion control algorithm calculates the actual sending rate to avoid congestion, while the video stream bitrate is absolutely independent from the calculated sending bitrate. When the network is in congested state or near to this state the calculated sending rate should be much lower than the video bitrate. In this situation the retransmissions should be disabled.

The TFRC protocol can not distinguish congestion loss and wireless loss; therefore the sending rate will be lower than the really achievable rate. Using alternative congestion control methods which effectively estimates the congestion loss, the performance of the selective retransmission scheme can be improved. We used ARC and WLED integrated with ARC instead of TFRC.

We used Ns2 (Network Simulator) to prove the efficiency of the selective retransmission algorithm based on congestion control and packet differentiation. The test results show that this method has significant effect on the improvement of the quality.

Keywords: multimedia, adaptive retransmission, video streaming