

Robust bandwidth aggregation for real-time video delivery in integrated heterogeneous wireless networks

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Abstract Bandwidth aggregation is the process of integrating the limited channel resources available in heterogeneous wireless networks. Optimizing this process is an important step towards improving the throughput and reliability for the bandwidth-demanding video applications. In this paper, we investigate the bandwidth aggregation for real-time video delivery in heterogeneous wireless networks from a video server to a multihomed client. Forward Error Correction (FEC) coding is commonly adopted for data protection in implementing loss-resilient wireless video transmission systems. However, the inherent channel unreliability, along with the video traffic variability, can significantly degrade the FEC performance. To address the critical issues, we propose a **ROBust Bandwidth Aggregation (ROBBIA)** scheme that includes three phases: (1) FEC redundancy adaption, (2) transmission rate assignment, and (3) path interleaving. We present a mathematical formulation of the transmission scheduling to minimize end-to-end video distortion and provide comprehensive analysis for the channel distortion. We conduct the performance evaluation in the Exata and simulation results show that ROBBIA outperforms existing bandwidth aggregation approaches in improving video quality in terms of PSNR (Peak Signal-to-Noise Ratio).

Keywords Heterogeneous wireless networks · Bandwidth aggregation · Streaming video · Forward error correction · Path interleaving

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