



RESEARCH ARTICLE

Secure and Energy-Efficient Cooperative Video Distribution over Wireless Networks

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Abstract— For real-time video broadcast where multiple users are interested in the same content, mobile-to-mobile cooperation can be utilized to improve delivery efficiency and reduce network utilization. Under such cooperation, however, real-time video transmission requires end-to-end delay bounds. Due to the inherently stochastic nature of wireless fading channels, deterministic delay bounds are prohibitively difficult to guarantee. For a scalable video structure, an alternative is to provide statistical guarantees using the concept of effective capacity/bandwidth by deriving quality of service exponents for each video layer. Using this concept, we formulate the resource allocation problem for general multi hop multicast network flows and derive the optimal solution that minimizes the total energy consumption while guaranteeing a statistical end-to-end delay bound on each network path.

Indexed Terms: - wireless fading channels, multi hop network, mobile-to-mobile cooperation.

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