

Inefficient resource management may cause problems of reliability of service in shared medium wireless networks. Resources include bandwidth, processor cycles and buffers. Excessive competition for these resources can cause severe packet collision rates, compound network congestion, or even result in starvation of some nodes. In such a situation, data transmission is subject to very long delays and significant packet loss. Although transport layer protocols can help improve end-to-end performance, these approaches are slow in responding to network changes and incur additional overhead. In this paper, we aim to reduce transmission delay and increase packet delivery ratio. A hybrid resource allocation problem is formulated and a controller is derived to decrease congestion globally and to reduce collisions locally. Our simulation results show that this hybrid controller can achieve packet loss rates below 1% and significantly shorten end-to-end delay even in a high interference environment with heavy system load. A preamble detection model and SINR collision model based on frame error rate were added to ns-2 to improve the accuracy of the results.