The IEEE 802.16 Broadband Wireless Access (BWA) system offers a cost-effective solution to the last-mile wireless connection problem. Optimal scheduling mechanisms and resource allocation strategies are required to provide the necessary QoS guarantees to the multimedia traffic in BWA systems while utilizing the resources as efficiently as possible. In this paper, we propose a utility based fractional knapsack framework for bandwidth allocation in IEEE 802.16e broadband wireless networks with multiple classes of traffic flows. The proposed mechanism also includes dynamic weight adjustment to provide fairness among different competing traffic classes by prioritizing traffic depending on the load conditions and QoS requirements. We study the system performance in terms of normalized throughput and mean delay for each traffic class. From the results we find that the proposed mechanism improves throughput and decreases mean delay for varying traffic load compared to well-known allocation strategies.

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Index Terms

Computer Science Wireless Communications
Keywords
IEEE 802.16  Utility  Dynamic Weight Assignment  Quality Of Service  Resource Allocation