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Adaptive reservation tdma protocol for wireless multimedia traffic (Article)

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Abstract

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An Adaptive Reservation Time Division Multiple Access (AR-TDMA) control protocol for Wireless Asynchronous Transfer Mode (WATM) networks is proposed in this paper. AR-TDMA combines the advantages of distributed access and centralised control for transporting Constant Bit Rate (CBR), Variable Bit Rate (VBR) and Available Bit Rate (ABR) traffic efficiently over a wireless channel. The contention slots access for reservation requests is governed by two protocols, the Adaptive Framed Pseudo-Bayesian Aloha with Adaptive Slot Assignment (AFPBAASA) protocol and the Framed Pseudo-Bayesian Aloha with Adaptively Prioritised Controlled Capture (FPBAAPCC) protocol. Both protocols provide different access priorities to the control packets in order to improve the Quality-of-Service (QoS) offered to time sensitive connections. AR-TDMA also features a novel integrated resource allocation algorithm that efficiently schedules terminals' reserved access to the wireless ATM channel by considering their requested bandwidth and QoS. Integration of CBR, voice, VBR, data and control traffic over the wireless ATM channel using the proposed AR-TDMA protocol is considered in the paper. The performance of the AR-TDMA in conjunction with the AFPBA-ASA protocol and FPBA-APCC protocol has been investigated and the simulation results are presented showing that the protocol satisfies the required QoS of each traffic category while providing a highly efficient utilisation of approximately 96% for the wireless ATM channel.

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