

Performance Analysis Of Buffered CSMA/CD Systems

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Summary

This paper presents a new approximation approach, called tagged user approach (TUA), for the queueing analysis of slotted CSMA/CD systems with a finite user population having either finite or infinite user buffer capacity. By assuming a symmetric channel, the performance analysis of the overall system is determined by the performance of an arbitrarily selected user, called the tagged user. With the further assumption that each user always operates with its equilibrium probability, the packet service time distribution can be obtained using a state Bow graph by studying the channel contention scheme. The obtained packet service time distribution is then applied to the queueing analysis of the tagged user using the standard queueing theory. That is, the analysis of the channel contention scheme and the analysis of the user queueing behavior are decoupled in this paper. Hence, TUA can be applied to complicated systems such as those where each user buffer may have bulk packet arrivals and random service discipline as long as the corresponding queueing theory is available. Since a state transition probability matrix is not required in TUA, the required amount of computation is quite small. Simulation results verify the high accuracy of the analysis.

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