

On the Merits of Impure Multi-Copy Schemes for Multichannel ALOHA with Deadlines

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ABSTRACT

Slotted multichannel ALOHA is used in many satellite-based networks for short messages and as a means of reserving channels for longer ones. For such uses, maximization of channel capacity subject to a user-specified deadline and a (small) permissible probability of exceeding it captures both the user requirements and the system owner's desires. An optimized multi-copy scheme, whereby a monotonically non-decreasing deterministic number of copies is transmitted in each round until success or deadline, has recently been shown to dramatically increase the deadline-constrained capacity. We show that permitting the number of copies transmitted in each round to be non-deterministic can further improve capacity, but only slightly.