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# The Use of Service Limits for Efficient Operation of Multi-Station Single-Medium Communication Systems


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**Abstract** Time limits are the major mechanisms used for controlling a large variety of multi-station single-medium computer-communication systems like the FDDI network and the IEEE 802.4 Token Bus. The proper use of these mechanisms is still not understood and rules for efficient system operation are not available. Our objective is the derivation of such rules. We use a cyclic polling model with different service limits ($k$-limited service) at the different queues, thus emulating time limits. We are interested in determining these $k$-limit values so as to minimize the mean waiting cost of messages in the system. A simple approximative approach is proposed for two major problems: One in which a limit is set on the token rotation time and one in which no limits are imposed. The approach is tested for a variety of cases and is shown to be very effective.



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