

Performance Evaluation of a Prioritized, Limited Multi-Server Processor-Sharing System that Includes Servers with Various Capacities

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Abstract : We present a prioritized, limited multi-server processor sharing (PS) system where each server has various capacities, and $N (\geq 2)$ priority classes are allowed in each PS server. In each prioritized, limited server, different service ratio is assigned to each class request, and the number of requests to be processed is limited to less than a certain number. Routing strategies of such prioritized, limited multi-server PS systems that take into account the capacity of each server are also presented, and a performance evaluation procedure for these strategies is discussed. Practical performance measures of these strategies, such as loss probability, mean waiting time, and mean sojourn time, are evaluated via simulation. In the PS server, at the arrival (or departure) of a request, the extension (shortening) of the remaining sojourn time of each request receiving service can be calculated by using the number of requests of each class and the priority ratio. Utilising a simulation program which executes these events and calculations, the performance of the proposed prioritized, limited multi-server PS rule can be analyzed. From the evaluation results, most suitable routing strategy for the loss or waiting system is clarified.

Keywords : processor sharing, multi-server, various capacity, N-priority classes, routing strategy, loss probability, mean sojourn time, mean waiting time, simulation

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