

Wait-Optimized Scheduler Algorithm for Efficient Process Scheduling in Computer Systems

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Abstract : Efficient process scheduling is a crucial factor in ensuring optimal system performance and resource utilization in computer systems. While various algorithms have been proposed over the years, there are still limitations to their effectiveness. This paper introduces a new Wait-Optimized Scheduler (WOS) algorithm that aims to minimize process waiting time by dividing them into two layers and considering both process time and waiting time. The WOS algorithm is non-preemptive and prioritizes processes with the shortest WOS. In the first layer, each process runs for a predetermined duration, and any unfinished process is subsequently moved to the second layer, resulting in a decrease in response time. Whenever the first layer is free or the number of processes in the second layer is twice that of the first layer, the algorithm sorts all the processes in the second layer based on their remaining time minus waiting time and sends one process to the first layer to run. This ensures that all processes eventually run, optimizing waiting time. To evaluate the performance of the WOS algorithm, we conducted experiments comparing its performance with traditional scheduling algorithms such as First-Come-First-Serve (FCFS) and Shortest-Job-First (SJF). The results showed that the WOS algorithm outperformed the traditional algorithms in reducing the waiting time of processes, particularly in scenarios with a large number of short tasks with long wait times. Our study highlights the effectiveness of the WOS algorithm in improving process scheduling efficiency in computer systems. By reducing process waiting time, the WOS algorithm can improve system performance and resource utilization. The findings of this study provide valuable insights for researchers and practitioners in developing and implementing efficient process scheduling algorithms.

Keywords : process scheduling, wait-optimized scheduler, response time, non-preemptive, waiting time, traditional scheduling algorithms, first-come-first-serve, shortest-job-first, system performance, resource utilization

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